PIPELINES AND NATURAL RESOURCES ON THE TEXAS COAST

PIPELINES AND NATURAL RESOURCES OF THE TEXAS COAST

John Batterton, Project Manager

Rebecca Green, Cartographer

Environmental Management Program

Mike Hightower, Program Manager

General Land Office

Bob Armstrong, Commissioner

29 February 1980

Funded by a grant from the
National Oceanic and Atmospheric Administration
through the Coastal Energy Impact Program

ADVISORY COMMITTEE

Allen Cluck	Houston Oil and Minerals Corporation
Julius Collins	Texas Shrimp Association
Charles Crabbe	Golden Triangle Sierra Club
Dr. Lynne Drawe	Welder Wildlife Foundation
Leland Roberts	Texas Parks and Wildlife Department
O. J. Shirley	Shell Oil Company
Dr. L. O. Sorensen	Pan American University Marine Science Laboratory
Rick Tinnin	Citizens for Estuarine Planning
Willard T. Young	Eastern Transmission Corporation

ACKNOWLEDGEMENTS

We would like to express our appreciation to the members of the advisory committee for their technical advice and continued encouragement throughout this project.

We are also indebted to many General Land Office staff members for their assistance in collecting data and preparing this report for publication, particularly: Dr. William L. Longley, for critical review and valuable suggestions; Muriel Wright, for editorial assistance; Ted Mecklin, for helping to compile and map data; Dr. Jerry McAtee, for information on sand dunes; Judy Hamner, Meg Wilson and Pat Haar, for supportive research; and Delores Seaton, Steve Stubbs, and Steve Miller, for administrative support. We are especially grateful to Judy Lewis, who typed the final copy, and to Yvonne Rios, Rosemary Rodriguez, Margarita Alvarez, Corrine Gorrell, Joan Berry, and Dianna Hartford, who typed the draft copy.

Special thanks are due Claude Lard, of the U. S. Fish and Wildlife Service; Barto Arnold, of the Texas Antiquities Committee; Dr. John Hamilton, of the Texas Natural Areas Survey; Dr. Robert A. Morton, of the Bureau of Economic Geology at The University of Texas; Dr. Calvin McMillan and Lee Sherrod, of the University of Texas Department of Botany; and Dr. L. O. Sorensen, of the Pan American University Marine Science Laboratory.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

INTRODUCTION

This study, initiated in March of 1979, was funded by a grant under the Coastal Energy Impact Program (CEIP). Established by amendment of the federal Coastal Zone Management Act of 1972, the CEIP makes federal grants, loans, and guarantees available to coastal states and local governments to help them meet needs arising from outer continental shelf (OCS) oil and gas development. A principal objective of the program is the prevention or mitigation of damage to any environmental resource by activities associated with coastal energy development.

One such activity is the routing and installation of pipelines. Pipelines from the OCS must traverse state-owned submerged lands to reach onshore processing and distribution facilities. As custodian of state-owned lands in Texas, including 4.25 million acres of submerged lands, the General Land Office obtained CEIP funding to compile information that could be used in pipeline planning to reduce or prevent adverse impacts on sensitive natural resource areas.

Applicants for easements across public lands for pipeline rights-of-way, as well as other industrial interests, will find this information of interest because it specifies environmental concerns of the General Land Office and the School Land Board. The information in this report complements existing rules published in the Texas Register concerning management of activities on state-owned lands. These include School Land Board Rules 135.16.03.001-016., 135.18.01.001-.008, and 135.18.02.001-.004, and General Land Office Rules 126.18.02.001-.006. Standards issued

by the General Land Office for pipelines requiring a right-of-way across state lands are contained in Appendix K. The land office has also promulgated rules that apply to the routing of pipelines through critical dune areas (General Land Office Rule 126.30.004(b)).

While the information presented here does not have official status, it is a substantial portion of the information base used by the General Land Office and School Land Board in assessing applications for leases and easements.

The value of this study is in its usefulness as a single source of current information relevant to the routing of pipelines on coastal public land. Some of the information, such as the location of existing pipelines, is incomplete. Because of incomplete records, some old pipelines are not included, nor are recently installed pipelines.

All of this information will become dated with time; therefore, the format of this report has been designed to allow future corrections and additions of new data. This updating effort will be dependent upon budget and staff constraints of the General Land Office.

Report Format

The state and federal regulations and guidelines that protect many sensitive natural resource areas often describe these areas only by type; they do not specify their locations. For this reason, the General Land Office selected mapping as the most useful means for identifying areas of concern in pipeline planning.

The maps depict two types of themes: sensitive natural resource areas, and other features that may facilitate planning efforts. The resource areas identified as being particularly vulnerable to possible

damage from pipeline installation activities are, for the most part, highly productive biological areas such as oyster reefs, wetland environments, and rookeries. State land tracts containing features of archeological interest are also included as areas that pipeline routes should avoid.

Other themes of interest to pipeline planners include the locations of existing pipelines, the boundaries of state and federal land tracts, surface sediment distribution, channels, and areas subject to natural hazards.

Areas of the Gulf of Mexico to the gulf shoreline (including both federal and state tracts) are depicted on Bureau of Land Management (BLM) maps at a scale of 1:48,000. The shoreline and bay areas (state tracts only) are depicted on U. S. Geological Survey (USGS) 7½-minute quadrangle topographic maps at a scale of 1:24,000. The areas covered by the BLM and USGS maps overlap along the gulf shoreline; thus, a pipeline route may be followed from federal tracts on the OCS to the 3-league line, then across state tracts to a mainland landfall.

Themes mapped for the Gulf of Mexico on the BLM maps are either part of the original base maps or plotted directly on them. These themes are:

Pipelines

State and Federal Tracts

Fault Zones

Reefs, Banks, or Hard Bottoms

State Tracts of Archeological Interest

Safety Fairways, Anchorage Areas

Themes mapped for the gulf shoreline and bay areas on the USGS maps are either part of the base maps or plotted on transparent mylar overlays that can be used with the base maps to produce composite blueline maps. These themes are:

Pipelines

State Tracts

Beach Erosion/Accretion

Channels

Dunes

Surface Sediments

Wetlands

Biologic Assemblages

Oyster Reefs

Rookeries

Mangroves

Parks, Wildlife Refuge Areas

State Tracts of Archeological Interest

This report consists primarily of two sets of map descriptions, one for BLM maps and one for USGS maps, which list the information available for each mapped area. Each set of descriptions is prefixed by an explanation of the symbols used to depict the themes.

The information contained on the maps and in the descriptions has been compiled from several sources, chiefly: the Bureau of Economic Geology at The University of Texas at Austin, Texas; the U. S. Bureau of Land Management; the U. S. Geological Survey; the Texas Parks and Wildlife Department; the Texas Antiquities Committee; the Texas Colonial Waterbird Census Committee; and the General Land Office.

Copies of this report may be obtained from the General Land Office. At the present time, copies of the BLM maps are not available; however, the original maps are on open file in the General Land Office and may be viewed during agency working hours.

Blueline copies of themes on the USGS maps may be ordered from the General Land Office on a prepaid basis. Those requesting maps should be aware that not all USGS themes can be combined on a single composite map, as information will be too crowded to be useful. If numerous themes are requested, two or more composite bluelines will be made. A separate map can be made for each overlay, or several composites can be made depicting compatible themes.

Inquiries regarding availability and prices of blueline reproductions should be directed to:

Environmental Management Program
General Land Office
1700 North Congress Avenue
Austin, Texas 78701

Telephone: (512) 475-5596

MAP THEMES

Sensitive Resource Themes

Reefs, Banks, or Hard Bottoms (plotted on BLM base maps)

Reefs, banks, and hard bottoms are areas where fish congregate and which may contain unusual biological communities such as coral reefs. These areas could be adversely impacted by sedimentation resulting from pipeline installation and, because they are topographically higher than the surrounding bottom, could present an obstacle to pipeline routing.

One such area, the Flower Garden Banks, located about 125 miles southeast of Galveston, has been nominated as a marine sanctuary.

Dunes (overlay for USGS base maps)

The fore-island dunes are important as reservoirs of sand for beach nourishment and serve as natural seawalls for storm protection. Where stabilizing dune vegetation is disturbed or removed, blowouts (gaps in the fore-island dune ridge) can develop. If the elevation of a blowout area is reduced to near sea level, high tides or storm surges can form washover channels. Therefore, the preservation of vegetated areas on barrier islands is important.

The state's concern for the protection of dunes is reflected in the Dune Protection Act, which directs the Commissioner of the General Land Office to designate dune areas that are critical to the protection of state-owned lands, shores, and submerged land (TEX. NAT. RES. CODE Sec. 63.121).

Wetlands (part of USGS base maps, overlay for USGS base maps)

Wetlands are areas saturated or inundated by groundwater or surface water that support highly productive plant communities specially adapted to saturated soils. They are areas of great natural productivity, hydrological utility, and environmental diversity. They provide natural flood control, improved water quality, flow stabilization of streams and rivers, habitat for fishery and wildlife resources, and vital materials for adjacent aquatic ecoysystems. Wetlands contribute to the production of agricultural products and are also recreational, scientific, and aesthetic resources.

The unwise use and development of wetlands will destroy many of their special qualities and important natural functions. Therefore, the need to conserve wetlands has been recognized by: executive order of the President of the United States (Executive Order 11990); policies and regulations of federal agencies through the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500); the Coastal Wetland Acquisition Act (Art. 5415e-3, V.A.C.S.), enacted by the 65th Texas Legislature, and rules promulgated by the General Land Office for implementation of the act (General Land Office Rules 126.30.04.001-.004); and specific state agency policies such as Texas Parks and Wildlife Commission Policy No. 3000-9, concerning dredge spoil.

Wetland areas should be avoided unless alternative locations are not practicable. If wetland sites are the only feasible locations for some activities, state and federal agencies will likely require strict management of these activities to ensure minimum alteration of wetlands and restoration of disturbed areas.

The USGS base maps and wetlands overlay show only the locations of wetlands, without specifying wetland types. Wetlands are identified by type (e.g., freshwater, brackish, or saltwater marsh) on the biologic assemblage overlays. Generally, the humid upper coast contains large wetland areas, and the arid lower coast contains smaller wetland areas including extensive wind-tidal flats and subaqueous grassflats.

Oyster Reefs (USGS map overlays for Galveston and San Antonio Bays)

Oyster reefs are highly productive and commercially valuable natural areas. They are vulnerable not only to direct damage by dredging, but to suffocation by the increased sedimentation that can result from dredging.

The major areas of oyster production in Texas are Galveston and San Antonio Bays. The general location of other oyster reefs coastwide may be found under the headings "Biological Description" and "Surface Sediments" in the map descriptions.

Rookeries (overlay for USGS base maps)

Rookeries along the Texas coast support a great variety of fish-eating birds, including herons, cranes, pelicans, ibises, storks, egrets, and cormorants. Most coastal rookeries are on spoil islands at the margins of shallow bays and lagoons and along the Gulf Intracoastal Waterway and other channels.

These rookeries are protected by state and federal regulations for two reasons: they are important habitats for large numbers of birds, and they are used by several threatened and endangered species, such as the brown pelican, the whooping crane, the reddish egret, and the lesser tern.

The birds that inhabit the rookeries are vulnerable not only to direct destruction or alteration of their nesting and roosting grounds, but to indirect disturbances such as human activity or loud noise in the vicinity of these areas. For this reason, regulations prohibit certain types of activities in and near rookeries during the nesting season, which for most species runs approximately from February through September.

Mangroves (overlay for USGS base maps)

Black mangrove areas are an unusual type of wetland on the Texas coast, appearing principally in two locations: in the vicinity of Port Aransas (especially Harbor Island) and Port Isabel. Small communities may occur near Port O'Connor, Galveston, and Texas Point, but these have not been recently confirmed (Roberts, McMillan and Sherrod, personal communications).

Mangroves are woody shrubs whose aerial roots trap waterborne sediment, thus building up the soil. Dense stands of mangroves are highly productive and function as a major source of detrital material that enters the estuarine food web. Mangroves also afford protection and shelter to many bay organisms and are often rookery sites.

Biologic Assemblages (overlay for USGS base maps)

The biologic assemblage overlays depict major natural environments on state lands, both sensitive and nonsensitive. The highly productive and fragile areas shown on these overlays include submerged grasses, which are important as fish and shellfish nursery areas; oyster reefs; and marshes, particularly saltwater marshes and brackish marshes in the vicinity of bays and lagoons, and freshwater marshes further inland.

Algal mats, a feature of some Texas estuaries, are not shown on the maps for lack of information about their exact locations; however, they often occur in areas described as "sand flats," especially along the lower coast. Mangrove areas, shown on a separate overlay, are not depicted on the biologic assemblage overlays.

State Tracts of Archeological Interest (plotted on BLM base maps)

Archeological sites, though not natural areas, are still classified as sensitive. Such sites within state lands are protected by provisions of the Texas Natural Resources Code and rules of the Texas Antiquities Committee.

The sites mapped as being of interest in pipeline routing are shipwreck sites, most of which are at depths of 30 feet or less near passes. The shipwrecks are designated as either historical (before 1900) or twentieth-century. The maps do not show the exact locations of shipwrecks, but indicate which state tracts contain them. Omission of either of the above designations from a state tract does not necessarily mean that no shipwreck is present.

Additional Themes

Pipelines (plotted on BLM base maps, overlay for USGS base maps)

The maps show all pipelines installed before this study was initiated (March 1979) for which lease data is available. Some older pipelines are not mapped because lease records are incomplete.

This theme shows the position of existing pipelines relative to the identified sensitive areas and to other types of areas where pipeline installation is restricted by state or federal law.

State and Federal Tracts (part of BLM base maps, overlay for USGS base maps)

Land tracts are the basic management unit for state and federal leases and easements. In this report, they also serve as a reference aid for locating features on the maps.

State tracts are within the 3-league line (10.35 miles offshore), which is the boundary between state and federal lands. In general, state tracts closest to the shoreline are 1 square mile in area, and those further out are 9 square miles in area. Tracts may be of irregular size and shape in bays and lakes, adjacent to the gulf shoreline, at the 3-league line, and at the boundary with Louisiana.

Federal tracts are generally 9 square miles in area but may be smaller and irregularly shaped along the 3-league line and adjacent to an artificial boundary in federal waters that is an extension of the boundary line between the waters of Texas and Louisiana.

Some 9-square-mile tracts in the Gulf of Mexico straddle the 3-league line. In these cases, the portion seaward of the line is under federal jurisdiction and the landward portion is state-owned.

Safety Fairways and Anchorage Areas (part of BLM base maps)

Activities in safety fairways (shipping lanes) and anchorage areas are subject to federal regulations. The hazards that ship traffic and anchoring pose to pipelines are obvious.

The U.S. Army Corps of Engineers requires that pipelines crossing a navigation fairway be buried at least 10 feet. Pipelines may not cross an anchorage area, though they may originate in such an area. These pipelines must be buried at a minimum depth of 16 feet.

Fault Zones (plotted on BLM base maps)

Both inactive and potentially active faults are shown. Inactive faults are those that do not intersect the seafloor, that are commonly overlain by sediments that appear to be unfaulted, and for which no movement in the recent geologic past is indicated. Potentially active faults intersect or are near the seafloor. Movement of these faults has occurred in the recent geologic past and reactivation is possible. In both cases, the approximate displacement has been measured at depths of 400 to 600 feet.

The maps show only the locations of faulting areas. It is impossible to predict the likelihood of fault movement during the life of a pipeline from the information given on the maps.

Beach Erosion/Accretion (overlay for USGS base maps)

The locations of areas of erosion and accretion on the gulf shoreline are mapped to aid planners in selecting pipeline landfall sites.

Surface Sediments (overlay for USGS base maps)

Knowledge of the distribution of surface sediments will be useful in the planning of any dredging activities associated with pipeline installation.

Generally, the sediments of the bays, estuaries, and lagoons are coarsest at river mouths, along some bay margins, near tidal inlets, and adjacent to barrier islands and peninsulas. Sediments are finest in the deeper bay centers. The relative proportion of mud to sand is greatest in the bays of the upper Texas coast and lowest in the bays and lagoons of the lower coast. The offshore extent of sand sediments is greater along the lower coast and limited along the upper coast.

Biologic Assemblages (overlay for USGS base maps)

As explained in the description of sensitive resource themes above, the biologic assemblage overlays describe all major natural environments along the coast. Units other than sensitive resource areas are useful as indicators of ranges of salinity, temperature, water depth, tidal influence, and the presence of flora and fauna.

Parks, Wildlife Refuge Areas (part of USGS base maps, on state tract overlay for USGS base maps)

This theme includes both state and federal wildlife management areas, refuges, sanctuaries, and parks. If the maps are updated, the

locations of county, municipal, and private parks and sanctuaries will be added.

It may prove expedient to avoid these protected areas whenever possible because of potential difficulties in obtaining new pipeline rights-of-way.

BLM MAPS

Maps produced by the Bureau of Land Management were used as base maps for the depiction of features important to the selection of pipeline routes from the Gulf of Mexico to the shoreline. These maps, at a scale of 1:48,000, overlap the area covered by the USGS maps, showing federal as well as state land tracts; thus, they show the origins of federal pipelines on the outer continental shelf.

The manner in which each BLM theme is depicted on the maps is described below.

Pipelines (plotted on base map)

The locations of existing pipelines, mapped as solid lines, are based primarily on lease data of the Bureau of Land Management and the General Land Office. Some single lines on the maps represent two or more parallel pipelines. Appendices A through H list state tracts that contain dense concentrations of pipelines too numerous to be mapped.

The identification number on each mapped pipeline indicates the product transported, the General Land Office easement file number, and the diameter of the pipeline. The prefix O designates an oil pipeline, the prefix G designates a gas pipeline, and the prefix O/G designates an oil and gas pipeline. The number G-3226-10 3/4", for example, indicates that the pipeline carries natural gas, is 10 3/4 inches in diameter, and is described in General Land Office miscellaneous easement file no. 3226.

The notation ME, which stands for "miscellaneous easement," sometimes appears as a prefix to pipeline identification numbers on the

BLM maps. This is the classification for coastal pipeline easements in the General Land Office files. The ME code must be given along with the easement file number to obtain any coastal easement file from the General Land Office Records Division.

Some identification numbers contain the notation W, which indicates the transport of water. The word "brine" is printed next to some identification numbers to indicate the transport of this material.

To determine whether an easement is expired, renewed, or transferred, one must refer to the current General Land Office easement file. Corporate name changes are not given in the easement files; thus both old and new names will be seen. For example, old files for Exxon Corp. use the name Humble Oil and Refining Co. Most of the lessees of the pipeline rights-of-way depicted on the maps are identified in the map descriptions.

State and Federal Tracts (part of base map)

State and federal land tracts are represented on the maps as a grid. Each tract is numbered. In the map descriptions, small state tracts (1 square mile in area) are identified by a lowercase s at the end of the tract number; for example, 14s. Large state tracts (9 square miles in area) are identified by an uppercase L at the end of the tract number; for example, 28L. Only gulf tracts are referenced in the descriptions.

Quadrants of large tracts are labelled 1Q (northwest quadrant), 2Q (northeast quadrant), 3Q (southeast quadrant), and 4Q (southwest quadrant). The quadrant number is written after a hyphen at the end of the tract number. The notation 28L-1,2Q would refer to both the northwest and northeast quadrants of the large tract numbered 28.

Safety Fairways and Anchorage Areas (part of base map)

Safety fairways and anchorage areas are delineated by broken lines.

Fault Zones (plotted on base map)

Fault zones are indicated by solid lines with perpendicular tic marks. Information on fault zones was taken from McGowen and Morton (1979).

Reefs, Banks, or Hard Bottoms (plotted on base map)

These areas are circled and identified by name on the maps. The locations of areas included in this report were taken from BLM maps (Bureau of Land Management, 1980). For complete descriptions of these areas, see Bright and Pequegant (1974) and Bright and Rezak (1976, 1978a, 1978b).

State Tracts of Archeological Interest (plotted on base map)

State tracts containing historical (pre-twentieth century) or twentieth century shipwrecks are designated by colored geometric symbols. The mapped information is based on records of the Texas Antiquities Committee (Arnold, personal communication).

Map Descriptions

Figure 1 is an index to the areas represented by the BLM maps. The maps are identified by number. Table 1 shows which of the themes discussed above apply to each map. Theme-by-theme descriptions of the maps follow.

The notation "No data" under a theme heading in the description indicates that information was either unavailable or insufficient for mapping. This notation is also used when the name of a lessee is unknown. The notation "Not applicable" appears when a theme does not apply to a given map; for example, the theme State Tracts of Archeological Interest would not be applicable to a map showing only federal tracts.

Figure 1.

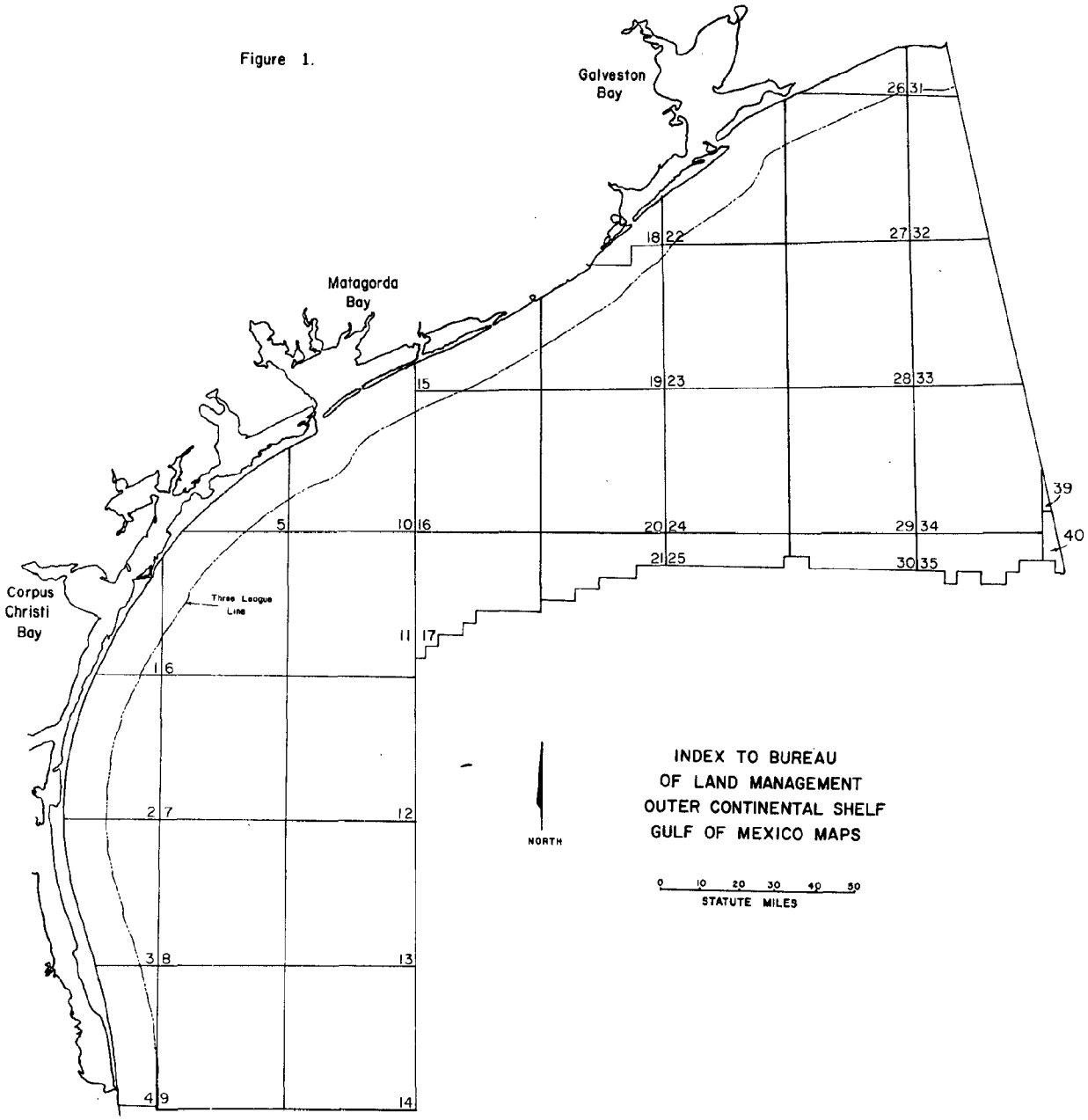

Galveston Bay
Matagorda Bay
Corpus Christi Bay
Three League Line
26 31
18 22 27 32
15 19 23 28 33
39
5 10 16 20 24 29 34
40
21 25 30 35
11 17
1 6
2 7 12
3 8 13
4 9 14
NORTH
INDEX TO BUREAU
OF LAND MANAGEMENT
OUTER CONTINENTAL SHELF
GULF OF MEXICO MAPS
0 10 20 30 40 50
STATUTE MILES

TABLE 1. THEMES ON BLM MAPS

BLM Map No.	Pipelines	Safety Fairways Anchorage Areas	Fault Zones	Reefs, Banks or Hard Bottoms	State Tracts Archeological Interest
1	X		X		X
2			X		X
3	X		X		X
4	X		X		X
5	X		X		X
6	X				
7				X	
8				X	
9				X	
10	X		X		X
11	X			X	
12					
13					
14					
15	X		X		X
16	X	X			
17	X	X			
18	X		X		X
19	X	X	X	X	X
20	X	X			
21					
22	X	X	X		X
23	X	X			
24		X			
25					
26	X		X		X
27	X	X	X		X
28	X	X			
29	X	X			
30	X			X	
31	X	X	X		X
32	X	X			
33	X	X			
34	X				
35	X			X	
39	X			X	
40					

BLM MAP NO. 1

Pipelines

G-2560	Reynolds Mining Corp.
G-4005-(G-1745)-2 3/8" & 4½"	Texaco, Inc.
G-3533-6 5/8"	McMoran Exploration Co.
0/G-3531-6 5/8"	McMoran Exploration Co.
G-3946-8"	United Gas Pipeline Co.
G-3875-(G-1630)-12"	United Gas Pipeline Co.
G-4109-6" (2)	Gulf Oil Corp.
G-1826-4" (2)	Gulf Oil Corp.
G-2893-6 5/8"	Occidental Petroleum, Inc.
G-3699-6 5/8"	McMoran Exploration Co.
G-2882-6"	Sun Oil Co.
G-3414-6"	Energy Reserves Group

Safety Fairways, Anchorage Areas

No data

Fault Zones

There are several inactive and potentially active fault zones in this area.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

873s
885s
889s
893s
772L-3Q

State tracts with both historical and twentieth century shipwrecks:

847s
848s
849s
854s through 858s
915s
916s
917s
922s
923s

BLM MAP NO. 2

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
There are a few inactive fault zones, one within 2 miles of the shoreline.

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
985s
1000s
1008s
1021s
1030s
839L-1, 2Q
924L-3Q

BLM MAP NO. 3

Pipelines

2933-4½" (3)	Mobil Oil Corp.
3115-8 5/8"	Mobil Oil Corp.

Safety Fairways, Anchorage Areas

No data

Fault Zones

There is one inactive fault in the vicinity of tracts 934L and 944L.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with historical shipwrecks:

- 1057s
- 1058s
- 1061s

State tracts with twentieth century shipwrecks:

- 1100s
- 1104s
- 1111s
- 1118s
- 1025L-1, 2Q

State tracts with both historical and twentieth century shipwrecks:

- 1085s
- 1124s
- 1127s

BLM MAP NO. 4

Pipelines

3115-8 5/8"	Mobil Oil Corp.
O/G-2933-4½" (3)	Mobil Oil Corp.

Safety Fairways, Anchorage Areas

No data

Fault Zones

Both inactive and potentially active fault zones exist in many small tracts and in all large tracts except 1063L.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with historical shipwrecks:

- 1139s
- 1153s
- 1230s

State tracts with twentieth century shipwrecks:

- 1149s
- 1162s
- 1189s
- 1192s
- 1196s
- 1197s
- 1207s
- 1214s
- 1216s
- 1217s
- 1218s
- 1070L-3Q
- 1129L-1Q

State tracts with both historical and twentieth century shipwrecks:

- 1211s
- 1219s
- 1220s
- 1223s through 1226s
- 1231s

BLM MAP NO. 5

Pipelines

G-3450-4½"	McMoran Exploration Co.
G-3452-4½"	McMoran Exploration Co.
G-3453-3"	McMoran Exploration Co.
G-3454-6"	McMoran Exploration Co.
O/G-4059-4½"	McMoran Exploration Co.
G-4010-10"	Corpus Christi Oil and Gas Co.
G-3226-10 3/4"	Corpus Christi Oil and Gas Co.
G-3286-10 3/4"	Corpus Christi Oil and Gas Co.
G-2926-10"	Corpus Christi Oil and Gas Co.
O/G-4047-6 5/8"	Corpus Christi Oil and Gas Co.
G-2927-8 5/8"	Corpus Christi Oil and Gas Co.

Safety Fairways, Anchorage Areas

No data

Fault Zones

There are inactive faults in the vicinity of tracts 597L, 598L, 626L and 660L.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

- 700s
- 751s
- 775s
- 798s

BLM MAP NO. 6

Pipelines

3450-4½"	McMoran Exploration Co.
3452-4½"	McMoran Exploration Co.
3414-6"	Energy Reserves Group, Inc.
2893-6 5/8"	Occidental Petroleum, Inc.

Safety Fairways, Anchorage Areas

No data

Fault Zones

No data

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

No data

BLM MAP NO. 7

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
Dream Bank in tract A-41L
Southern Bank in tracts A-9L and A-16L

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 8

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
Blackfish Ridge in tracts A-72L and A-61L
Mysterious Bank in tracts A-84L and A-83L

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 9

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
Sebree Bank in tract 1071L

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 10

Pipelines

G-3673-12"	Lo-Vaca Gathering Co.
G-3672-12"	Lo-Vaca Gathering Co.
G-3170-6 5/8" & 3½" (2)	Superior Oil Co.
G-3923-3½" (2)	Superior Oil Co.
O/G-4046-6 5/8" & 10 3/4"	Corpus Christi Oil and Gas Co.
G-3511-20"	Houston Pipeline Co.
G-3512-10"	Corpus Christi Oil and Gas Co.

Safety Fairways, Anchorage Areas

No data

Fault Zones

There are inactive faults in the vicinity of tracts 444L, 445L, 561L and 594L.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with historical shipwrecks:

592s
599s
600s
674s
679s

State tracts with twentieth century shipwrecks:

601s
616s
592L-4Q
599L-4Q
622L-1Q

State tracts with both historical and twentieth century shipwrecks:

627s through 656s

BLM MAP NO. 11

Pipelines
G-3351-20" Transco

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
Small Dunn Bar in tracts A-6L and A-54L
Big Dunn Bar in tracts A-54L and A-55L
Baker Rock in tract A-62L
South Baker Rock in tract A-95L
Aransas Rock in tract A-117L
North Hospital Rock in tract A-117L
Hospital Rock in A-136L.

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 12

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 13

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 14

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 15

Pipelines

0-2597-16"	Monsanto Co.
G-2587-5 5/8" (2)	North American Royalties, Inc.
G-2588-5 5/8" (2)	North American Royalties, Inc.
G-3480-10 3/4"	Lo-Vaca Gathering Co.
12"	Lo-Vaca Gathering Co.
G-3470-16"	Lo-Vaca Gathering Co.
G-3482-8 5/8" (2)	Lo-Vaca Gathering Co.
G-2114-30"	Transcontinental Gas Pipeline Co.
G-3972-6"	Transcontinental Gas Pipeline Co.
G-2857-8 5/8"	Coastal States Gas

Safety Fairways, Anchorage Areas

No data

Fault Zones

There are many overlapping inactive and potentially active fault zones along the entire coastline.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

421s
514s
516s
409L-2Q
440L-3Q
442L-1, 2Q
443L-1, 2Q

BLM MAP NO. 16

Pipelines

G-1991-20"	Transco
G-1991A-20"	Transco
G-1991(2114)-30"	Transcontinental Gas Pipeline Corp.
G-3972-6"	Transcontinental Gas Pipeline Corp.
G-3482-8 5/8" (2)	Lo-Vaca Gathering Co.
G-3673-12"	Lo-Vaca Gathering Co.
G-3518-3½"	Monsanto Co.
O-2638-3"	Monsanto Co.
O-2639-3"	Monsanto Co.
G-3480-10 3/4", 12"	Lo-Vaca Gathering Co.
O-2597-16"	Monsanto Co.

Safety Fairways, Anchorage Areas
Aransas Pass Safety Fairway

Fault Zones
Not listed

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 17

Pipelines
G-3351-20" Transco
G-1991C-16" Transco

Safety Fairways, Anchorage Areas
Gulf Safety Fairway

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 18

Pipelines

0/G-3000(1381)-20" Blue Dolphin Pipeline Co.

Safety Fairways, Anchorage Areas

No data

Fault Zones

There are inactive faults in the vicinity of tracts 303s, 308s, 309s, 315s and 247L.

There is a potentially active fault zone further south.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with historical shipwrecks:

- 300s
- 301s
- 310s
- 311s
- 344s

State tracts with twentieth century shipwrecks:

- 299s
- 320s
- 330s

BLM MAP NO. 19

Pipelines

O/G-3483-4"	King Resources Co.
G-3874	DOE
G-3249-3" & 8"	Houston Pipeline Co.
O-2565-8 5/8"	Mobil Oil Corp.
O-2605-8 5/8"	Mobil Oil Corp.
G-3209-8"	Houston Pipeline Co.
G-1381-20"	Blue Dolphin Pipeline Co.

Safety Fairways, Anchorage Areas

Freeport Harbor Safety Fairway (with two adjacent anchorage areas.)
Aransas Pass Safety Fairway

Fault Zones

There are several overlapping potentially active fault zones southwest of the Freeport Harbor Safety Fairway.

Reefs, Banks, or Hard Bottoms

An artificial fishing reef (liberty ship) is located within state tract 336L-2Q.

State Tracts of Archeological Interest

State tracts with historical shipwrecks:

344s
376s
378s
411s

State tracts with twentieth century shipwrecks:

320s
330s
337s
387s
394s
409s
275L-1Q
276L-4Q
278L-4Q
305L-3Q
309L-4Q
311L-4Q
334L-1, 2Q
366L-4Q
367L-3Q
376L-1Q

State tracts with both historical and twentieth century shipwrecks:

312s
313s
314s
321s
406s

BLM MAP NO. 20

Pipelines

G-1991A-20"	Transco
G-1991B-20"	Transco

Safety Fairways, Anchorage Areas

Aransas Pass Safety Fairway

Fault Zones

No data

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

Not applicable

BLM MAP NO. 21

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 22

Pipelines

0-3089-6 5/8"	Houston Oil and Minerals
3804-14"	Amoco Oil Co.
G-3354-12"	Transco
G-3252-6 5/8"	Tejas Gas Corp.
G-3747(1501)-6"	Black Marlin Pipeline Co.
3667-8 5/8"	Seagull Pipeline Co.
0/G-3412-4½"	Houston Oil and Minerals Corp.
0/G-3408-4½"	Houston Oil and Minerals Corp.
0/G-3411-4½"	Houston Oil and Minerals Corp.
0/G-3409-4½"	Houston Oil and Minerals Corp.
0/G-3410-4½"	Houston Oil and Minerals Corp.
G-3406-3½" (4)	Houston Oil and Minerals Corp.
0/G-3538(3514)-3" (2)	Houston Oil and Minerals Corp.
0/G-3714-4" (2)	Houston Oil and Minerals Corp.
0/G-3413-2 7/8" & 8"	Houston Oil and Minerals Corp.
0-3559-3½" (4) & 4½" (2)	Houston Oil and Minerals Corp.
0/G-3407-3½" (8)	Houston Oil and Minerals Corp.
G-3381-20"	Seagull Pipeline Corp.
G-2470-8"	Natural Gas Pipeline Co.
G-3715-3" (2)	Mitchell Energy Offshore Corp.
0-2461-2 5/8"	Mitchell Energy Offshore Corp.
0-2465-4"	Mitchell Energy Offshore Corp.
3095-2 7/8" (2)	Houston Oil and Mineral Corp.

Safety Fairways, Anchorage Areas

Aransas Pass Safety Fairway

Galveston Entrance Safety Fairway and adjacent anchorage areas.

Fault Zones

There are several inactive and potentially active faults along the coast, particularly in the large tract areas.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with historical shipwrecks:

207s
215s
221s
229s
278s

State tracts with twentieth century shipwrecks:

147s
157s
170s
186s
187s
194s through 197s

BLM MAP NO. 22 (cont.)

200s
201s
208s
209s
211s
218s
222s
225s
99L-4Q
101L-3Q
102L
144L-2, 3Q
146L-3Q
148L-1, 3Q
149L-2Q
181L-3Q
182L-3Q
183L-2Q
187L-3Q
188L-4Q
190L-3, 4Q
191L-2Q
218L-3Q
219L-3Q

State tracts with both historical and twentieth century shipwrecks:

171s
184s
185s
188s through 193s
198s
199s
202s through 206s
210s
212s through 214s
216s
217s
219s
220s
223s
224s
226s
147L

BLM MAP NO. 23

Pipelines

3804-14"	Amoco Oil Co.
G-1381-20"	Blue Dolphin Pipeline Co.
G-1381A-6"	Coastal States
G-3354-12"	Transco

Safety Fairways, Anchorage Areas
Aransas Pass Safety Fairway
Freeport Harbor Safety Fairway

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 24

Pipelines
No data

Safety Fairways, Anchorage Areas
Freeport Harbor Safety Fairway

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 25

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 26

Pipelines

G-3381-20"	Seagull Pipeline Corp.
G-2005-4½"	King Resources Co.
O/G-445-4"	No data
G-2018-12"	Pennzoil Pipeline Co.
O-2421-4"	Chevron Oil Co.
O/G-3551-8"	Kilroy Co. of Texas
1572	Occidental Petroleum, Inc.
O-1816-8"	Atlantic Richfield Co.
1827-16"	United Gas Pipeline Co.
1852-12"	United Gas Pipeline Co.
G-1909(1833)-16"	Transco
G-3461-24"	Transco
G-1955	Transcontinental Gas Pipeline Co.

Safety Fairways, Anchorage Areas

No data

Fault Zones

There are 3 potentially active faults in the vicinity of tracts 66s, 6L, and 7L. There is a ring-shaped inactive fault around tract 85s.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with historical shipwrecks:

- 62s
- 64s
- 65s
- 101s
- 115s

State tracts with twentieth century shipwrecks:

- 12s
- 122s
- 8L-3Q
- 23L-4Q

BLM MAP NO. 27

Pipelines

G-3354-12"	Transco
G-4017-24"	Transco
3667-8 5/8"	Seagull Pipeline Co.
G-3381-20"	Seagull Pipeline Co.
G-1468-6"	Chevron
G-3747-6"	Black Marlin Pipeline Co.
G-3461-24"	Transco
G-3354-16"	Transco
G-1909(1833)-16"	Transco
2421	Chevron Oil Co.
3551-8"	Kilroy Co. of Texas
2018-12"	Pennzoil Pipeline Co.
3129-2 7/8"	King Resources Co.
2005-4½"	King Resources Co.

Safety Fairways, Anchorage Areas

Calcasieu Pass Fairway
Galveston Entrance Safety Fairway

Fault Zones

There are potentially active faults in the vicinity of tracts 141s, 142s, 31L, 33L, 53L, 63L, and 97L.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

132s
30L-1Q

BLM MAP NO. 28

Pipelines
0/G-3804-14" Amoco Oil Co.

Safety Fairways, Anchorage Areas
Galveston Entrance Safety Fairway

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 29

Pipelines

G-3302-30"	Hi Island
G-3829	No data
G-3834	No data
G-4055	No data

Safety Fairways, Anchorage Areas

There are 2 safety fairways in this area.

Fault Zones

No data

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

Not applicable

BLM MAP NO. 30

Pipelines
G-3302-30" Hi Island

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
Applebaum Bank in tract A-590L

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 31

Pipelines

O-3651-3½" & 6 5/8"	C & K Petroleum, Inc.
G-1955-10"	Transco
G-3461-24"	Transco
G-4021-12"	Tejas Gas Corp.
G-2184-16"	United Gas Pipeline Co.
G-2391-16"	Natural Gas Pipeline Co. of America

Safety Fairways, Anchorage Areas

There are two safety fairways in this area.

Fault Zones

There are inactive and potentially active fault zones in the vicinity of tracts 5L, 12L, and 21L.

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

1s
9s
22s
28s
32s
34s
35s
38s
11L-1Q
12L-3Q
13L-4Q

BLM MAP NO. 32

Pipelines

G-1856-4" (2)	Tidal
G-1856-6"	Tidal
G-1856-12"	Tidal
G-1856-16"	Tidal
G-1856A-12"	Tidal
G-3446-12"	Natural Gas Pipeline Co.
G-3302-42"	Hi Island
G-3886-16"	United Gas
G-2391-16"	Natural Gas Pipeline Co.

Safety Fairways, Anchorage Areas

There is one safety fairway in this area.

Fault Zones

No data

Reefs, Banks, or Hard Bottoms

No data

State Tracts of Archeological Interest

Not applicable

BLM MAP NO. 33

Pipelines
G-3302-42" Hi Island

Safety Fairways, Anchorage Areas
There is one safety fairway in this area.

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 34

Pipelines

G-3302-30" (3), 36" & 42"	Hi Island
G-3422-36"	HIOS
G-3623	No data
G-3427-12"	Texas Gas
G-4030	No data
G-3430-12"	Natural Gas Pipeline Co.
G-3423-20"	Natural Gas Pipeline Co.
G-4040	No data
G-3859	No data
G-4039	No data
G-3857	No data
G-4013	No data
G-4045	No data
G-3428-16"	Texas Gas

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 35

Pipelines

G-3429-16"	Texas Gas
G-3302-30"	Hi Island

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
The East Flower Garden Bank coral reefs are in tracts A-374, A-375, A-388, and A-389.
The West Flower Garden Bank coral reefs are in tracts A-383, A-384, A-398 and A-399.
The Coffee Lump Bank is partly in tract A-359.

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 39

Pipelines
G-3454-24" Stingray

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
Within tract A-329-L is 29 Fathom Bank.

State Tracts of Archeological Interest
Not applicable

BLM MAP NO. 40

Pipelines
No data

Safety Fairways, Anchorage Areas
No data

Fault Zones
No data

Reefs, Banks, or Hard Bottoms
No data

State Tracts of Archeological Interest
Not applicable

USGS MAPS

USGS 7½-minute topographic quadrangles were used as base maps for the depiction of features important to the selection of pipeline routes across state-owned submerged lands. At a scale of 1:24,000, a larger scale than that of the BLM maps, the USGS maps are particularly useful for the examination of possible pipeline landfall areas.

The manner in which each of the USGS themes is represented on the maps is described below. Following these explanations are four sample maps illustrating the mapped themes (figure 2).

Map Themes

Pipelines (overlay)

The locations of existing pipelines, mapped as solid lines, are based primarily on lease data of the General Land Office. Some single lines on the overlays represent two or more parallel pipelines. Appendices A through H list state stracts that contain dense concentrations of pipelines too numerous to be mapped.

The identification number on each mapped pipeline indicates the product transported, the General Land Office easement file number, and the diameter of the pipeline. The prefix O designates an oil pipeline, the prefix G designates a gas pipeline, and the prefix O/G designates an oil and gas pipeline. The number G-3226-10 3/4", for example, indicates that the pipeline carries natural gas, is 10 3/4 inches in diameter, and is described in General Land Office miscellaneous easement file no. 3226.

Some identification numbers contain in notation W, which indicates the transport of water. The word "brine" is sometimes printed next to an identification number to indicate the transport of this material.

To determine whether an easement is expired, renewed, or transferred, one must refer to the current General Land Office easement file. Corporate name changes are not given in the easement files; thus, both old and new names will be seen. For example, old files for Exxon Corp. use the name Humble Oil and Refining Co. Most of the lessees of the pipeline rights-of-way depicted on the maps are identified in the map descriptions.

State Tracts (overlay)

State tracts are represented on the maps as a grid. Tracts are numbered consecutively in the gulf, in bays, and in lakes. Because bays and lakes are numbered independently, the same number may appear on a bay or lake tract and a gulf tract, a bay tract and a lake tract, or tracts in two different bays or two different lakes.

In the map descriptions, small state tracts (1 square mile in area) are identified by a lowercase s at the end of the tract number; for example, 14s. Large state tracts (9 square miles in area) are identified by an uppercase L at the end of the tract number; for example, 28L. Only gulf tracts are referenced in the descriptions.

Quadrants of large tracts are labelled 1Q (northwest quadrant), 2Q (northeast quadrant), 3Q (southeast quadrant), and 4Q (southwest quadrant). The quadrant number is written after a hyphen at the end of the tract number. The notation 28L-1,2Q would refer to both the northwest and northeast quadrants of the large tract numbered 28.

Beach Erosion/Accretion (overlay)

Zones of beach erosion or accretion are depicted by arrows parallel to the gulf shoreline. Rates of 0-10 ft/yr, 10-20 ft/yr, and over 20 ft/yr are printed in the middle of the zone.

The rates of erosion and accretion were calculated by averaging recorded annual rates from 1937 to 1978 (Morton et al., 1978). This information was compiled by the General Land Office (1978).

Channels (part of base map)

Channels are indicated on the maps by dashed lines. Names of major channels are printed within the lines.

Dunes (overlay)

Stable dune areas, blowouts, and washover channels are circumscribed on the maps. The notation SD indicates an area of stabilized (vegetated) dunes. The notation B denotes a blowout area. Washover areas are indicated by arrows perpendicular to the gulf beach.

This information is based upon aerial photography from the General Land Office as well as information from the Bureau of Economic Geology (Brown et al., 1974). Detailed descriptions of dunes along the Texas coast may be found in the Environmental Geologic Atlas of the Texas Coastal Zone (Brown, project coordinator, in progress).

Surface Sediments (overlay)

The distribution of surface sediments is indicated by circumscribed areas labelled with double capital letters denoting sediment composition;

for example, A_B means sandy mud, B_A means sand. The key to the surface sediment overlays is contained in Appendix J.

The mapped information for surface sediments is based on 6,797 samples collected at one-mile intervals along the bays and outer continental shelf by the Bureau of Economic Geology (McGowen and Morton, 1979), aided by funding from the General Land Office.

Wetlands (overlay and part of base map)

Wetland areas are outlined. On the overlays, a thick solid line with perpendicular tic marks is used. Areas described as wetlands on the overlays and in this report are described as marshes on the USGS base maps.

Biologic Assemblages (overlay)

These overlays depict natural environments on the Texas Coast. Each environment is circumscribed and contains a letter/number code that denotes its type; for example, F_1 indicates an oyster reef. The legend for the biologic assemblage overlays is contained in Appendix I.

The information on biologic assemblages is based on the Environments and Biologic Assemblage maps of the Environmental Geologic Atlas of The Texas Coastal Zone (Brown, project coordinator, in progress).

Oyster Reefs (overlay for San Antonio and Galveston Bays)

These overlays show the areal outlines of both viable and nonviable oyster reefs in the two bay systems. The notation OR appears in the outlined areas.

The information mapped for these two bay systems is based on data obtained from the Texas Parks and Wildlife Department (Roberts, personal communication).

Rookeries (overlay)

Rookeries are represented as circumscribed areas containing a letter/

number code (for example, gP-3) which is a key to annual data on colony location, species composition, and numbers of nesting pairs. The key to the codes may be found in the Texas Colonial Waterbird Census, 1973-1976 (Texas Parks and Wildlife Department, 1978), which was the source for the mapped rookery locations.

Mangroves (overlay)

The distribution of black mangroves is indicated on the maps by outlined areas labelled MG. The mapped information is based upon interpretation of General Land Office aerial photographs and individual observations (Sorensen, McMillan and Sherrod, personal communications).

Parks, Wildlife Refuge Areas (part of base map, on state tract overlay)

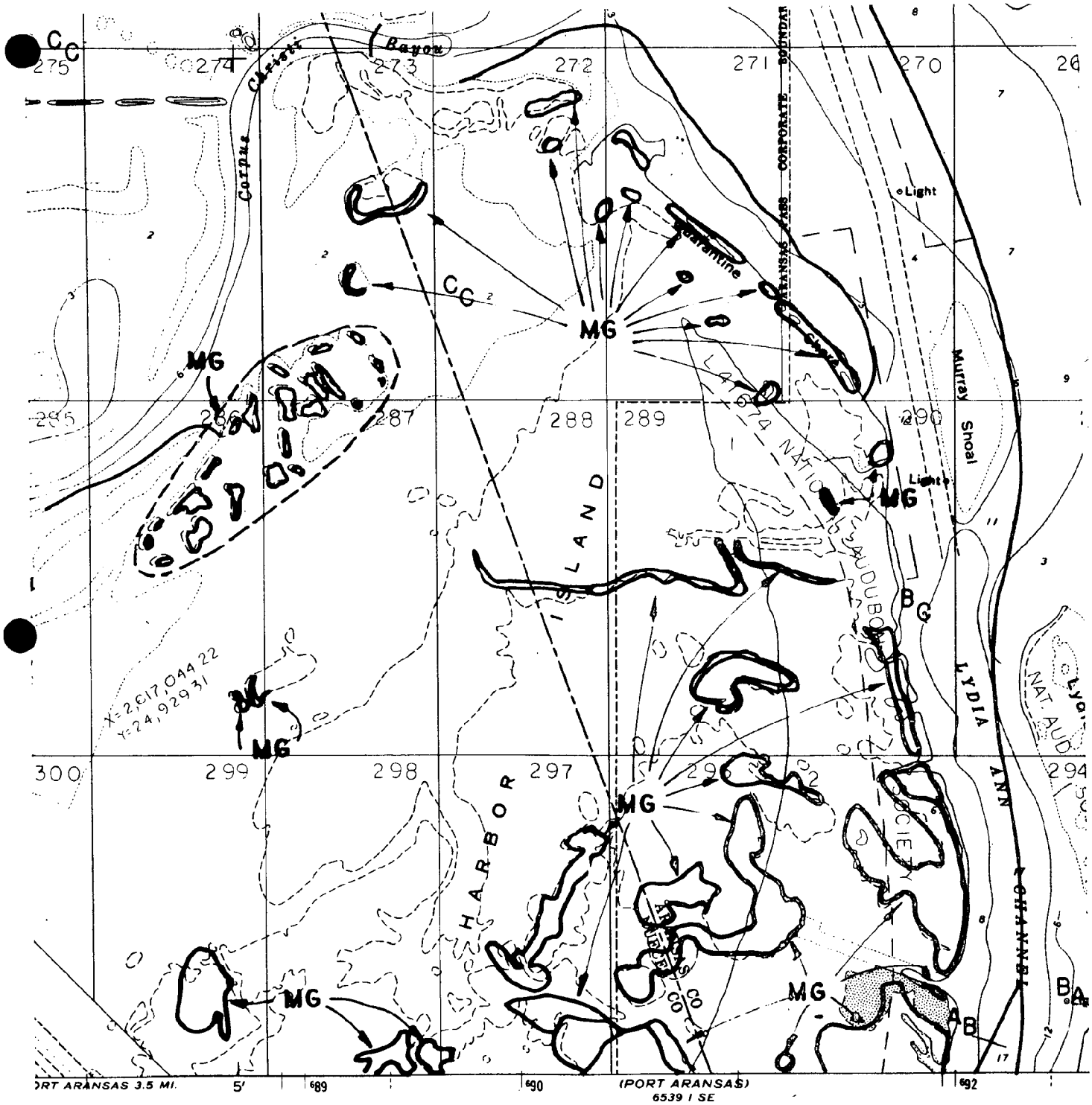
State and federal wildlife management areas, refuges, sanctuaries, and parks are identified by name and usually delineated by heavy or dashed boundary lines.

Information regarding new management areas and the enlargement of existing areas is available from the U. S. Fish and Wildlife Service and the Texas Parks and Wildlife Department. Public lands leased by the National Audubon Society for bird sanctuaries are described in the lease data of the General Land Office.

Figure 2

SAMPLE USGS MAPS

The map section labelled Estes shows mangroves, channels, and an Audubon Society sanctuary. The sample labelled Allyns Bight illustrates the depiction of dunes. The Bacliff map section shows oyster reefs and rookeries. Themes depicted on the Mud Lake sample are surface sediments, biologic assemblages, state tracts, pipelines, and zones of erosion and accretion.



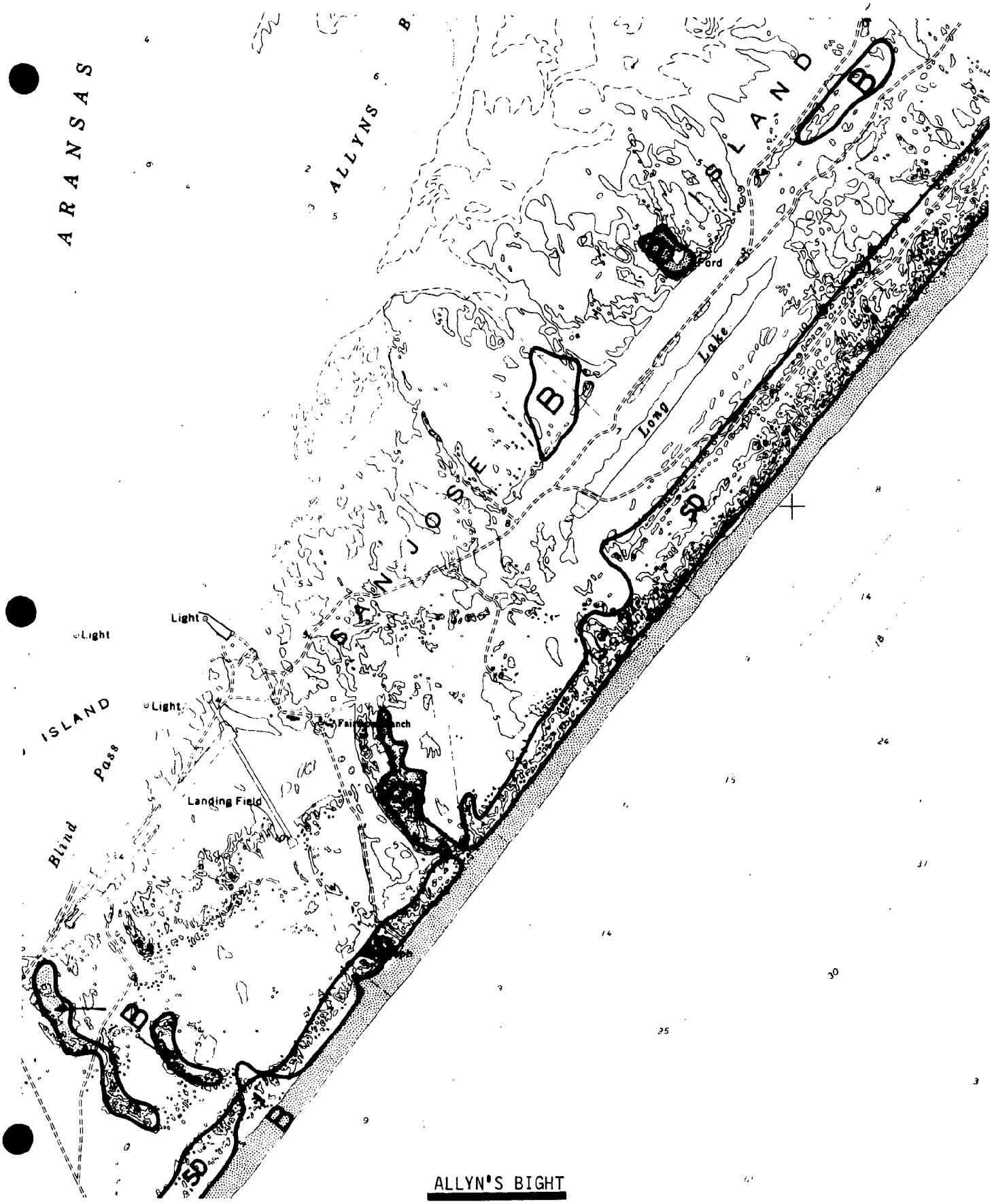
SCALE 1:24000

1 MILE
7000 FEET
1 KILOMETER

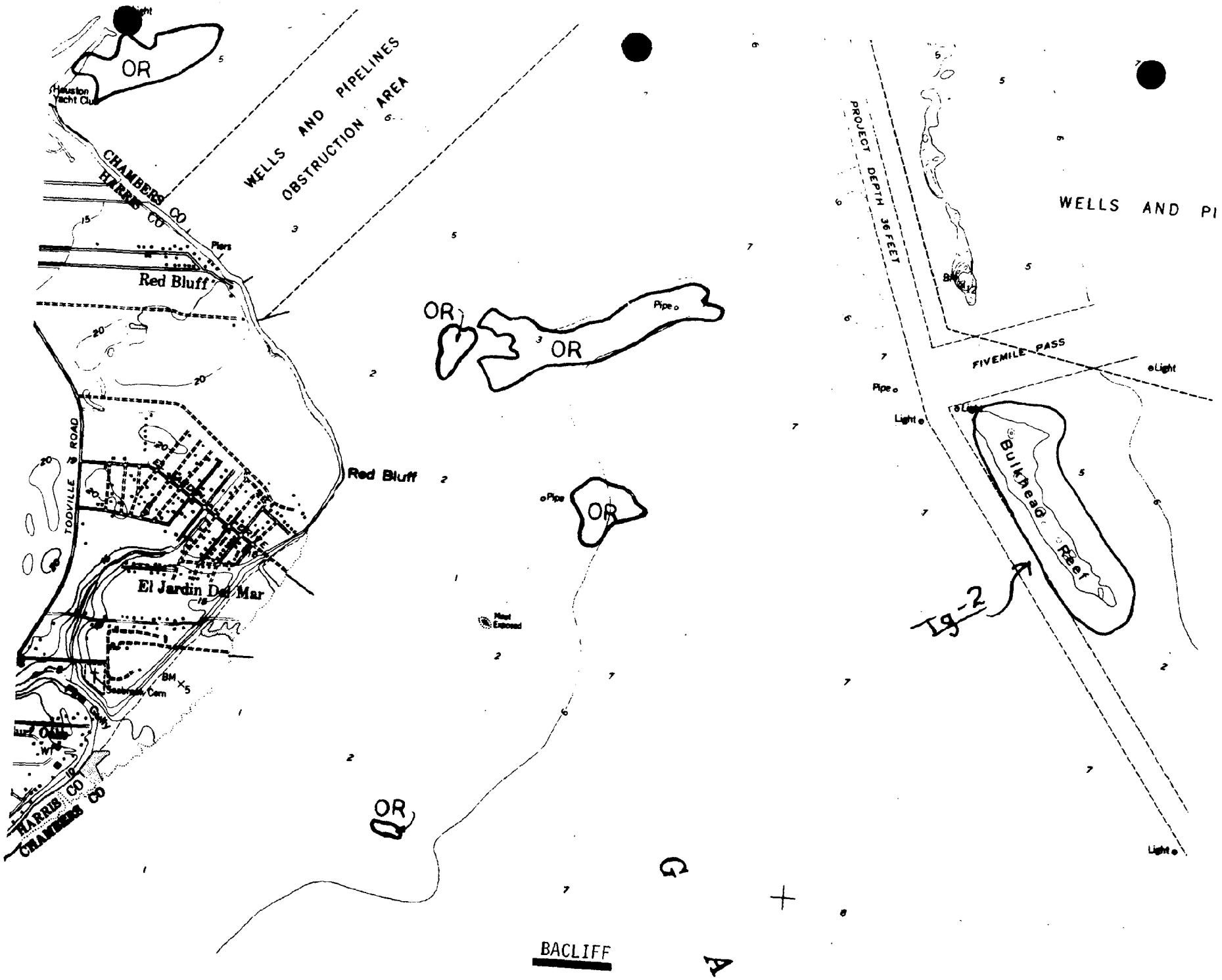
CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS NEGLIGIBLE

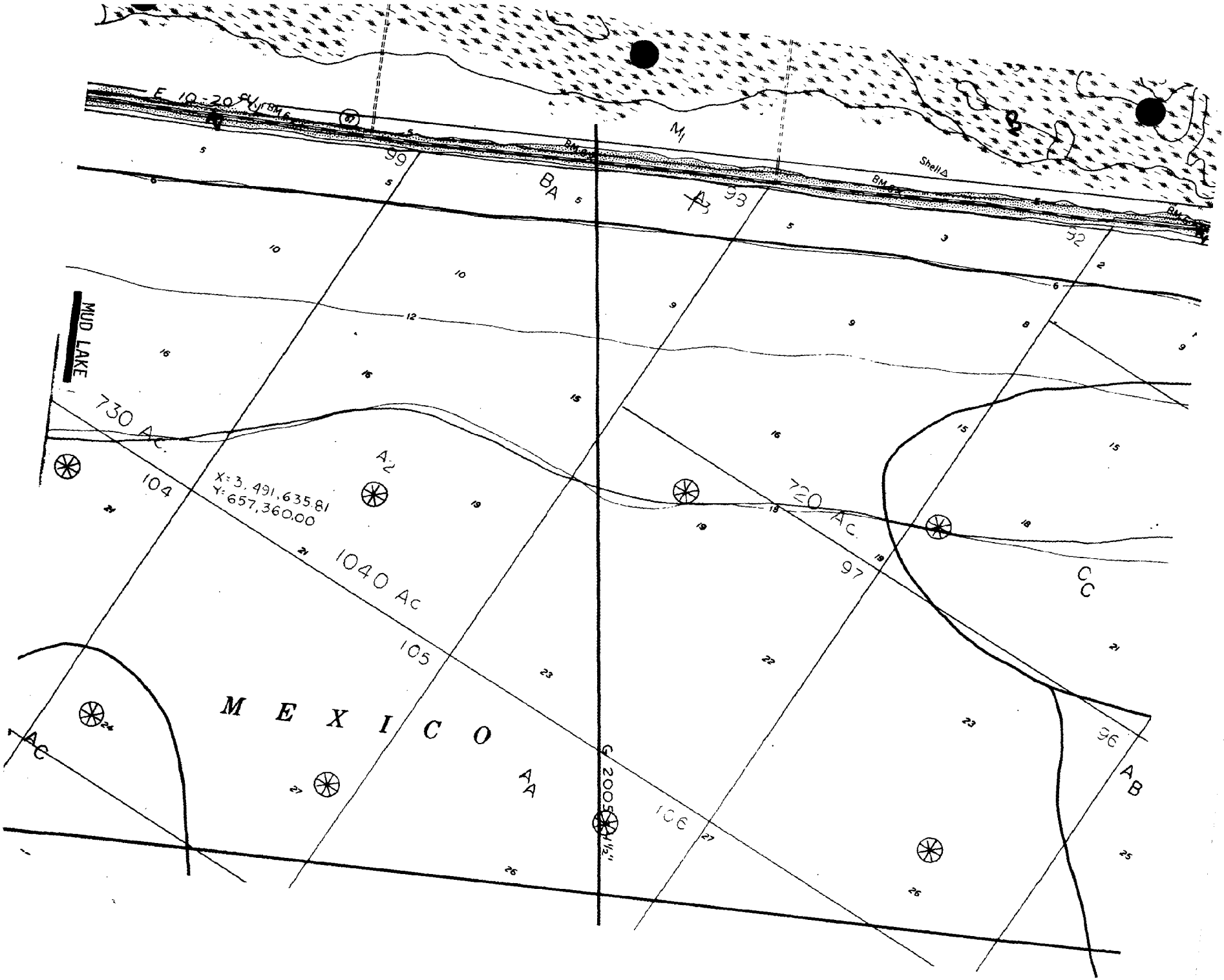
ESTES

ND 1971 MAGNETIC NORTH



ALLYN'S BIGHT


OR
Houston Yacht Club
CHAMBERS CO
HARRIS CO
WELLS AND PIPELINES OBSTRUCTION AREA
Piers
Red Bluff
TODVILLE ROAD
El Jardin Del Mar
BM X5
Cem
Wr
HARRIS CO
CHAMBERS CO
Pipe
Light
PROJECT DEPTH 36 FEET
WELLS AND PI
FIVEMILE PASS
Bulkhead
Reef
Ig-2
BACLIFF
G
A


E 10-20 FV
BM
Shell Δ
M1
99
98
93
92
MUD LAKE
730 Ac.
720 Ac.
1040 Ac
104
105
106
97
96
X=3,491,635.81
Y=657,360.00
MEXICO
7 Ac
2005
1½"

State Tracts of Archeological Interest

This theme is not depicted on the USGS maps, but the tracts containing shipwreck sites are listed in the map descriptions.

Map Descriptions

The two maps (in pocket), one showing the upper Texas coast and one showing the lower Texas coast, are indices to the areas covered by the USGS maps. Each quadrangle contains a number that corresponds to the numbers on the map descriptions, which also give the names of the quadrangles.

Table 2 shows which of the themes discussed above are depicted on each map. The map descriptions list the information available for each theme. The notation "No data" under a theme heading indicates that information was either unavailable or insufficient for mapping. This notation is also used when the name of a lessee is not known. The notation "Not applicable" appears when a theme does not apply to a given map; for example, the theme Dunes would not be applicable to a quadrangle that does not show the coastline.

The sections headed Biological Description summarize the biologic assemblage information for each map and list identified sensitive areas.

TABLE 2 THEMES ON USGS MAPS

USGS MAP TITLES	ONE OVERLAY		SEPARATE OVERLAYS						OVERLAY AND PART OF BASE MAP		LISTED ONLY
	PIPELINES	BEACH EROSION ACCRETION	DUNES	BIOLOGIC ASSEMBLAGES	OYSTER REEFS	ROOKERIES	MANGROVES	SURFACE SEDIMENTS	WETLANDS	PARKS, WILDLIFE REFUGE AREAS	STATE TRACTS ARCHEOLOGICAL INTEREST
1. PORT ARTHUR NORTH				X		X		X	X		
2. WEST OF GREENS BAYOU	X			X		X		X	X	X	
3. PORT ARTHUR SOUTH	X			X				X	X		
4. WEST OF JOHNSONS BAYOU				X				X	X	X	
5. STAR LAKE		X		X		X		X	X		X
6. CLAM LAKE		X	X	X				X	X	X	
7. SABINE PASS	X	X		X				X	X	X	X
8. TEXAS POINT	X	X		X				X	X		
9. COVE				X		X		X	X		
10. ANAHUAC				X				X	X		
11. LA PORTE				X				X	X		
12. MORGAN POINT	X			X	X	X		X	X		
13. UMBRELLA POINT	X			X	X			X			
14. OAK ISLAND	X			X				X	X		
15. LEAGUE CITY				X	X			X			
16. BACLIFF	X			X	X	X		X			
17. SMITH POINT	X			X	X	X		X	X	X	
18. LAKE STEPHENSON	X			X	X	X		X	X		
19. FROZEN POINT	X	X	X	X	X	X		X	X	X	
20. HIGH ISLAND		X	X	X		X		X	X	X	X
21. MUD LAKE	X	X	X	X				X	X		X
22. SOUTH OF STAR LAKE	X	X		X				X	X		X
23. TEXAS CITY	X			X		X		X	X	X	
24. PORT BOLIVAR	X			X	X	X		X	X		
25. FLAKE	X	X	X	X	X			X	X		X
26. CAPLEN	X	X	X	X				X	X		X
27. VIRGINIA POINT	X			X		X		X	X		
28. GALVESTON	X	X	X	X		X		X	X		X
29. THE JETTIES		X	X	X		X		X		X	X
30. HOSKINS MOUND	X			X				X	X		

TABLE 2 THEMES ON USGS MAPS (CONT.)

USGS MAP TITLES	ONE OVERLAY		SEPARATE OVERLAYS						OVERLAY AND PART OF BASE MAP		LISTED ONLY
	PIPELINES	BEACH EROSION ACCRETION	DUNES	BIOLOGIC ASSEMBLAGES	OYSTER REEFS	ROOKERIES	MANGROVES	SURFACE SEDIMENTS	WETLANDS	PARKS, WILDLIFE REFUGE AREAS	STATE TRACTS ARCHEOLOGICAL INTEREST
31. SEA ISLE	X	X	X	X		X		X	X		
32. LAKE COMO	X	X	X	X		X		X	X	X	X
33. OYSTER CREEK				X					X	X	
34. CHRISTMAS POINT	X	X	X	X		X		X	X	X	X
35. SAN LUIS PASS		X	X	X		X		X	X		X
36. JONES CREEK			X	X					X	X	
37. FREEPORT	X	X	X	X				X	X	X	X
38. LAKE AUSTIN				X				X	X		
39. SARGENT		X	X	X				X	X		
40. CEDAR LAKES WEST	X	X	X	X				X	X		
41. CEDAR LAKES EAST		X	X	X		X		X	X	X	X
42. KAMEY	X			X				X	X		
43. POINT COMFORT	X			X		X		X	X		
44. OLIVIA	X			X				X	X		
45. TURTLE BAY				X				X	X		
46. PALACIOS	X			X		X		X	X		
47. PALACIOS NE				X				X	X		
48. MATAGORDA	X		X	X		X		X	X		X
49. DRESSING POINT	X	X	X	X		X		X	X		
50. BROWN CEDAR CUT		X	X	X				X	X		
51. PORT LAVACA WEST				X				X	X		
52. PORT LAVACA EAST	X			X		X		X	X		
53. KELLER BAY	X			X		X		X	X		
54. MATAGORDA BAY	X			X				X			
55. PALACIOS POINT	X	X	X	X				X	X		X
56. PALACIOS SE	X	X	X	X				X	X		X
57. MATAGORDA SW	X	X	X	X				X	X		X
58. AUSTWELL	X			X		X		X	X		
59. SEADRIFT	X			X		X		X	X		
60. SEADRIFT SE	X			X				X	X		

TABLE 2 THEMES ON USGS MAPS (CONT.)

USGS MAP TITLES	ONE OVERLAY		SEPARATE OVERLAYS						OVERLAY AND PART OF BASE MAP		LISTED ONLY
	PIPELINES	BEACH EROSION ACCRETION	DUNES	BIOLOGIC ASSEMBLAGES	OYSTER REEFS	ROOKERIES	MANGROVES	SURFACE SEDIMENTS	WETLANDS	PARKS, WILDLIFE REFUGE AREAS	STATE TRACTS ARCHEOLOGICAL INTEREST
61. PORT O'CONNOR	X			X				X	X		X
62. DECROS POINT		X	X	X		X		X	X		X
63. SOUTH OF PALACIOS POINT		X	X	X				X	X		X
64. TIVOLI SW				X				X	X	X	
65. TIVOLI SE	X			X	X			X	X	X	
66. MOSQUITO POINT	X			X	X	X		X	X		
67. LONG ISLAND	X	X	X	X		X		X	X		
68. PASS CAVALLO SW	X	X	X	X		X		X	X		X
69. MISSION BAY				X					X		
70. LAMAR	X			X					X	X	
71. ST. CHARLES BAY	X			X		X			X	X	
72. MESQUITE BAY	X	X	X	X		X		X	X	X	X
73. PANTHER POINT	X	X	X	X		X		X	X		
74. PANTHER POINT NE	X	X	X	X				X			X
75. BAYSIDE	X			X					X		
76. ROCKPORT	X			X		X				X	
77. ST. CHARLES BAY SW	X	X	X	X		X		X	X	X	X
78. ST. CHARLES BAY SE	X	X	X	X		X		X	X		X
79. GREGORY	X			X				X	X		
80. ARANSAS PASS	X			X		X		X	X		
81. ESTES	X	X	X	X		X	X	X	X	X	
82. ALLYNS BIGHT	X	X	X	X				X	X		X
83. ARANSVILLE	X			X				X	X		
84. CORPUS CHRISTI	X			X				X	X		
85. PORTLAND	X			X		X					
86. PORT INGLESIDE	X			X		X		X	X		
87. PORT ARANSAS	X	X	X	X		X	X	X	X	X	X
88. OSO CREEK NE	X			X		X		X	X		
89. CRANE ISLANDS NW	X	X	X	X				X	X	X	X
90. PITA ISLAND	X	X	X	X		X		X		X	

USGS MAP TITLES	ONE OVERLAY		SEPARATE OVERLAYS						OVERLAY AND PART OF BASE MAP		LISTED ONLY
	PIPELINES	BEACH EROSION ACCRETION	DUNES	BIOLOGIC ASSEMBLAGES	OYSTER REEFS	ROOKERIES	MANGROVES	SURFACE SEDIMENTS	WETLANDS	PARKS, WILDLIFE REFUGE AREAS	STATE TRACTS ARCHEOLOGICAL INTEREST
91. CRANE ISLANDS SW	X	X	X	X				X	X		
92. RIVIERA BEACH NW	X			X				X			
93. RIVIERA BEACH NE				X							
94. SOUTH BIRD ISLAND NW	X			X				X	X		
95. SOUTH BIRD ISLAND	X	X	X	X		X		X		X	
96. RIVIERA BEACH	X			X				X			
97. KLEBERG POINT				X				X			
98. POINT OF ROCKS				X		X		X		X	
99. SOUTH BIRD ISLAND SE	X	X	X	X				X		X	X
100. SARITA 4 NE				X				X			
101. YARBOROUGH PASS	X	X	X	X				X		X	X
102. POTRERO CORTADO	X	X	X	X				X		X	
103. MARIA ESTELLA WELL				X							
104. POTRERO LOPENO NW	X	X	X	X				X		X	X
105. LOS AMIGOS WINDMILL				X				X			
106. POTRERO LOPENO SW	X			X		X		X		X	
107. POTRERO LOPENO SE		X	X	X				X		X	X
108. SOUTH OF POTRERO LOPENO NW	X			X				X		X	
109. SOUTH OF POTRERO LOPENO NE		X	X	X				X		X	X
110. PORT MANSFIELD	X			X		X		X			
111. SOUTH OF POTRERO LOPENO SE	X	X	X	X		X		X		X	X
112. HAWK ISLAND				X		X		X		X	
113. GREEN ISLAND			X	X		X		X		X	
114. NORTH OF PORT ISABEL NW	X	X	X	X				X			X
115. THREE ISLANDS	X			X		X		X		X	
116. NORTH OF PORT ISABEL SW	X	X	X	X				X			X
117. LA COMA	X			X		X		X		X	
118. PORT ISABEL NW		X	X	X		X		X		X	X
119. LAGUNA VISTA				X		X		X			
120. PORT ISABEL		X	X	X			X	X		X	X
121. MOUTH OF RIO GRANDE		X	X	X				X		X	X

1. PORT ARTHUR NORTH N2952.5-W9352.5/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
Neches River
Sabine Neches Canal
*GIWW

Dunes
Not applicable

Surface Sediments
Muddy sand and muddy shelly sand in this portion of Sabine Lake. Mud in Neches River and GIWW. Spoil areas along GIWW.

Wetlands
Vicinity of Molasses Bayou, areas adjacent to Neches River.

Biological Description
Sabine Lake is an enclosed bay type of habitat with variable river influence. Some areas of freshwater marsh are located along the Neches River. Most of the upland area is urbanized.

Oyster Reefs
No data

Rookeries
Rookery Qo-1 is historical.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

*Gulf Intracoastal Waterway

2. WEST OF GREENS BAYOU N2952.5-W9345/7.5

Pipelines
G-3007-6 5/8" Coastal States Gas Prod.

Beach Erosion/Accretion
Not applicable

Channels
Neches River
GIWW
Sabine River
Sabine Neches Canal

Dunes
Not applicable

Surface Sediments
Primarily mud, sandy mud to sand in Sabine Lake. Spoil areas along channels.

Wetlands
Extensive areas along north side of Sabine Lake.

Biological Description
Sabine Lake is relatively shallow, with variable salinity and low species diversity. Some saltwater marsh areas located alongshore.

Oyster Reefs
No data

Rookeries
Rookery Qp-1 is located on Sidney Island

Mangroves
No data

Parks, Wildlife Refuge Areas
Sydney Island, leased to the National Audubon Society, is managed as a bird sanctuary.

State Tracts of Archeological Interest
Not applicable

3. PORT ARTHUR SOUTH N2945-W9352.5/7.5

Pipelines
G-2035-16" United Gas Pipeline Co.

Beach Erosion/Accretion
Not applicable

Channels
GIWW
Sabine Neches Canal
Port Arthur Canal

Dunes
Not applicable

Surface Sediments
Mud to sandy mud; one area of shell and rock fragment gravel and shell reef. Spoil areas along canals and GIWW.

Wetlands
Throughout the general area adjacent to and west of the Port Arthur Canal.

Biological Description
Sabine Lake is relatively shallow, with variable salinity. Species diversity increases toward gulf. Marsh areas vary from freshwater inland to brackish and saltwater along lake. Some areas of made land.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

4. WEST OF JOHNSONS BAYOU N2945-W9345/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
Mud and sandy mud, muddy sand.

Wetlands
Extensive wetlands adjacent to Sabine Lake (in Louisiana).

Biological Description
Sabine Lake is shallow, with variable salinity. Saltwater marsh areas alongshore (Louisiana); brackish to freshwater marshes further inland.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
Sabine National Wildlife Refuge (Louisiana)

State Tracts of Archeological Interest
Not applicable

5. STAR LAKE N2937.5-W9407.5/7.5

Pipelines
No data

Beach Erosion/Accretion
A zone of erosion at 10-20 ft./yr.
A zone of accretion of 0-10 ft./yr.

Channels
GIWW

Dunes
No data

Surface Sediments
Sand beach to mud and relict stiff muds offshore.

Wetlands
Large wetland areas along Salt Bayou and on either side of GIWW.

Biological Description
Gulf beach habitat followed by saltwater, brackish, and freshwater marshes. Some prairie grasslands, fluvial woodlands further inland.

Oyster Reefs
No data

Rookeries
Sm-1 located near Willie Slough Gully
Sm-2 located near Salt Bayou
Sm-3 in the vicinity of Star Lake

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
62s

6. CLAM LAKE N2937.5-W9400/7.5

Pipelines
No data

Beach Erosion/Accretion
Zones of erosion at 10 ft./yr. to greater than 20 ft./yr.
A zone of accretion at up to 10 ft./yr.

Channels
GIWW

Dunes
Areas along 5 ft. contour stabilized by vegetation, but minimal, if any, dune formation.

Surface Sediments
Sand beach to mud and stiff relict mud offshore.

Wetlands
Extensive wetland areas along GIWW from Keith Lake to Clam Lake.

Biological Description
Gulf beach, with salt, brackish, and freshwater marshes further inland.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
Sea Rim State Park

State Tracts of Archeological Interest
No data

7. SABINE PASS N2937.5-W9352.5/7.5

Pipelines

0-3651-6 5/8" (1) & 3½" (1)	C & K Petroleum Inc. (Re of ME-1557)
G-2391-16"	Natural Gas Pipeline Co.
G-1833-16"	Transcontinental Gas Pipeline Corp.
G-1955-10"	Transcontinental Gas Pipeline Corp.
G-3461-24"	Transcontinental Gas Line Corp.
G-4021-12"	Tejas Gas Corp.

Beach Erosion/Accretion

Zones of erosion from 10-20 ft./yr. to over 20 ft./yr.

Channels

Sabine Pass

Dunes

No data

Surface Sediments

Sand beach to mud offshore

Wetlands

Wetland areas are bounded by Sabine Pass, Keith Lake, and gulf beach.

Biological Description

Gulf beach habitat changing to saltwater, brackish, and freshwater marshes, interspersed with grass-covered ridges, landlocked ponds and lakes, small urban areas.

Oyster Reefs

No data

Rookeries

No data

Mangroves

No data

Parks, Wildlife Refuge Areas

Sea Rim State Park

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

9s
11s
22s
35s

8. TEXAS POINT N2937.5-W9345/7.5

Pipelines
G-2184-16" United Gas Pipeline Co.

Beach Erosion/Accretion
A zone of erosion at over 20 ft./yr.
A zone of accretion at 10 ft./yr.

Channels
Sabine Pass anchorage basin and ship channel.

Dunes
No data

Surface Sediments
Mud and relict stiff muds offshore.

Wetlands
Wetland areas between gulf beach and Mud Lake.

Biological Description
Narrow beach habitat, changing to saltwater, brackish, and freshwater marshes inland, interspersed with grass-covered ridges. Small urban areas along Sabine Pass.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
No data

9. COVE N2945-W9445/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
Sand along bay edge, changing to muddy sand, sandy mud, and mud toward bay center.

Wetlands
Wetland areas are adjacent to and north of Trinity Bay.

Biological Description
Trinity Bay has lower species diversity than Galveston Bay. Some zones of submerged grasses in Trinity Bay. Extensive marshes of varying salinity are located along edges of Trinity Bay, Cotton Lake, and Old River Lake. Lost Lake has adjacent freshwater marshes. Upland changes from grasslands to mixed pine and hardwood forest.

Oyster Reefs
No data

Rookeries
Rh-1 located along Trinity River
Rh-2 and Rh-3 located north of Trinity River in wetland areas.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

10. ANAHUAC N2945-W9437.5/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
Trinity River

Dunes
Not applicable

Surface Sediments
Sand along bay shore changing to muddy sand, sandy mud and mud toward bay center.

Wetlands
Wetland areas located between Trinity Bay, Lake Anahuac and along Trinity River.

Biological Description
Trinity Bay is shallow, has low species diversity, and is adjacent to fresh- to brackish-water marshes. Lake Anahuac is a landlocked freshwater lake, also adjacent to fresh- to brackish-water marshes. Urban areas around Lake Anahuac.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

11. LA PORTE N2937.5-W9500/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
San Jacinto River-Houston Ship Channel

Dunes
Not applicable

Surface Sediments
Galveston Bay has a sand shoreline changing to mud toward bay center.
San Jacinto River contains primarily mud with some areas of sand.

Wetlands
Small areas of wetlands along San Jacinto River.

Biological Description
Most of the area is urban; otherwise, small marshy margins of channels and bays changing to grasslands and fluvial woodlands.
Much made land (spoil) along San Jacinto River.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

12. MORGAN POINT N2937.5-W9452.5/7.5

Pipelines

O/G 2225-12" & 14"	Humble Oil
ME-684-10"	No data
G-987-2"	Pipeline removed
O-825-2"	Pipeline removed
O-676-2"	No data
G-884-2"	Humble Oil
O/G-2345-2", 4", & 8"	Humble Oil
O/G-2977-6"	Exxon
O-2761-6"	Chevron (expired)
O-1907-4½"	Getty Oil
G-3677-8 5/8"	Tenngases Gas Gathering Co.

Beach Erosion/Accretion
Not applicable

Channels
San Jacinto River-Houston Ship Channel
Cedar Bayou Channel

Dunes
Not applicable

Surface Sediments
Mud and muddy sand in bay. Some areas of sand near Sea Crest Park.

Wetlands
Wetlands in vicinity of Cedar Bayou

Biological Description
Open shallow bay and bay margin habitat. Saltwater marsh and brackish-water marshes at Houston Point, Swan Marsh, and Cedar Bayou. Spoil areas along channels, Atkinson Island, and in bay. Upland mostly urban; some grasslands and wooded areas.

Oyster Reefs
Two large reefs in Trinity Bay; two smaller reefs in Galveston Bay.

Rookeries
Rookeries Sg-1 through Sg-4 are in vicinity of Atkinson Island, Fisher Marsh, and Cedar Bayou spoil area.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

13. UMBRELLA POINT N2937.5-W9445/7.5

Pipelines

O-1907-4½"	Getty Oil
G-3677-8 5/8"	Tenngases Gas Gathering Co.
O/G-3372-4"	Sun Oil Co.
G-1963-8" & 10"	Pennzoil Pipeline Co.
O-3801-4½"	Amerada Hess Corp.
O/G-2454-2 7/8"	McMoran Exploration Co.
G-2193-6"	Humble Oil
O-671-4"	No data
O/G-1359-6"	Expired
G-2741-4"	Exxon
G-2197-8"	Humble Oil
O-1124-6"	Abandoned
G-673-8"	No data
O-1992-4"	Humble Oil
O-992-2"	Cities Service
O-2864-3"	Exxon
O/G-3661-2½"	Exxon
O-1223-2½"	Humble Oil
O-1224-2½"	Humble Oil
O/G-2911-2½"	Exxon
G-3550-2½"	El Paso Natural Gas
O-5650-2½" & 2"	No data
O-2016-2"	Humble Oil
O-1216-2"	Abandoned
O/G-3224-2"	Exxon
O-2619-2½"	Exxon
O-2071-2½"	Humble Oil
O-1145-2"	Humble (expired)
O-3026-2"	Exxon
O-1206-2"	Humble Oil
O/G-1144-2½"	Humble Oil
O-2936-2"	Exxon
G-799	Texaco
4114-2"	Exxon
O/G-2198-6"	Humble Oil
O/G-1868-2"	Humble Oil
O-1729-2"	Humble Oil
O-3399-2½"	Exxon
O-3571-2"	Exxon
O-2562-2½" & 2"	Exxon
O/G-1869-2"	Humble Oil (cancelled)
O-3091-2"	South Texas Petroleum, Inc. (expired)
O/G-2430-2½"	Humble Oil

Beach Erosion/Accretion

Not applicable

Channels

No data

13. UMBRELLA POINT (cont.)

Dunes
Not applicable

Surface Sediments
Sand near bayshore changing to mud and sandy mud in bay.

Wetlands
No data

Biological Description
Open bay habitat, shallow, river-influenced, high turbidity, with low species diversity. Upland with prairie grassland, fluvial woodland, and urban areas.

Oyster Reefs
Large area of oyster reefs on the west side of Trinity Bay.

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

14. OAK ISLAND N2937.5-W9437.5/7.5

Pipelines

O/G-840-6 5/8"	Texaco (abandoned)
O/G-840-3"	Texaco (abandoned)
G-799	Texaco, Inc.
O-1680-2½"	Humble Oil
O/G-3417	Exxon
4114-2"	Exxon
O/G-2198-6"	Humble Oil
O/G-1868-2"	Humble Oil
G-2197-8"	Humble Oil
O/G-3469-8"	Exxon

Beach Erosion/Accretion
Not applicable

Channels
Trinity River Channel
Anahuac Channel

Dunes
Not applicable

Surface Sediments
Sand nearshore changing to mud, sandy mud, and some areas of shelly sand in bay.

Wetlands
Some wetland areas located along Anahuac Channel and south of Double Bayou.

Biological Description
River-influenced open bay and bay margin habitat with high turbidity and low species diversity. Spoil areas along channels; prairie grasslands upland.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

15. LEAGUE CITY N2930-W9500/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
Clear Lake Channel

Dunes
Not applicable

Surface Sediments
Primarily mud in Clear Lake. Galveston Bay has sand beach changing to mud, sandy mud, and sandy muddy shell in bay.

Wetlands
No data

Biological Description
Areas near Kemah and Todville in west Galveston Bay contained submerged grasses at one time. Spoil areas near Kemah. Brackish-water marsh areas in vicinities of Clear Lake, Clear Creek, Mud Lake and Taylor Lake. Upland with prairie grasslands and fluvial woodlands.

Oyster Reefs
Located east of Kemah near channel and east of Todville.

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

16. BACLIFF N2930-W9452.5/7.5

Pipelines

O-2238-10"	Humble
G-1937-2"	Sun Oil Co.
G-1995-2½"	Sun Oil Co.
G-1935-2½"	Sun Oil Co.
G-1936-2½"	Sun Oil Co.
G-1963-8" & 10"	Pennzoil Pipeline Co.
O/G-3850-4"	Houston Oil & Mineral
O/G-3435-6", 8" & 12"	Houston Oil & Mineral
O/G-3583-4"	Houston Oil & Mineral
O/G-3582-4"	Houston Oil & Mineral
O/G-3581-3"	Houston Oil & Mineral
4095-4"	Houston Oil & Mineral
O-3800-8"	Exxon (Re of ME-1644 & 2428)
O/G-2225-12" & 14"	Humble Oil
G-987-2"	Humble Oil (pipeline removed)
O-676-2"	Not listed
O-825-2"	Humble Oil (pipeline removed)
O/G-2345-2", 4" & 8"	Humble Oil
O/G-2345-2", 2½" (2), 4" (2), 8"	Humble Oil
O-2876-2"	Exxon
O-1678-2"	Humble
O-2875-2"	Exxon
G-2922-2"	Exxon (Re of ME-1123)
G-1000-2"	Cities Service
O-3605-2"	Exxon
G-1151-2"	Humble Oil
O-2847-2"	Amoco Pipeline Co.

Beach Erosion/Accretion

Not applicable

Channels

Houston Ship Channel
Clear Creek Channel
Clifton Channel

Dunes

Not applicable

Surface Sediments

Sand nearshore, changing to mud, sandy mud, and muddy sand in bay; shelly in vicinity of reefs.

Wetlands

No data

Biological Description

Enclosed bay and bay margin habitats. Soft substrate, high turbidity, extensive oyster reefs.

16. BACLIFF (cont.)

Oyster Reefs
Many scattered throughout Galveston Bay; largest areas near Red Fish Island and Red Fish Bar.

Rookeries
Rookeries Tg-1 on Red Fish Island and Tg-2 on Bulkhead Reef.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

17. SMITH POINT N2930-W9445/7.5

Pipelines

(See appendices A, B and C for listings of shorter pipelines in the Redfish Reef Oil Field.)

G-2908-6"	Seagull Pipeline Co.
O-3580-6 5/8" (2) & 4½"	Houston Oil & Mineral
O-2612-12"	Houston Oil & Mineral
O/G-3759-4" (2)	Hannah Island Gathering System
O/G-1976-12"	Pan American Gas Co.
O/G-1809-24"	Florida Gas Transmission Co.
O-2086-2"	Humble Oil
O-3668-2½"	Exxon (Re of ME-1575)
G-1864-4"	Houston Lighting & Power
O/G-2937-6"	Exxon (Re of ME-1139 & 1140)
G-1151-2"	Humble Oil
O-2238-10"	Humble Oil
O-2847-2½"	Amoco Pipeline
O-2390-2½"	Humble Oil
O/G-2345-2", 4" & 8"	Humble Oil
O-3606-2"	Exxon
G-3686-2"	Pinto Pipeline Co.
O-3253-6" & 4"	Exxon
O/G-2627-2" & 2½"	Exxon
O-1451-2½"	Abandoned
O/G-1520-2½"	Standard Oil Co. of Texas
O/G-3621-6 5/8"	Pennzoil Pipeline Co.
G-2760-6 5/8"	Chevron Oil Co.
O/G-3334-2½"	Davis Oil Co.
G-1122-4"	Sun Oil Co.
G-1908-4"	Abandoned
O/G-3372-4"	Sun Oil Co.
O-2761-6"	Chevron Oil (expired)
G-1963-8" & 10"	Pennzoil Pipeline Co.
G-3677-8 5/8"	Tenngases Gas Gathering Co.

Beach Erosion/Accretion

Not applicable

Channels

Trinity River Channel

Dunes

Not applicable

Surface Sediments

Bay is mostly mud; many reef areas, especially west of Smith Point, associated with mud and sandy shell.

17. SMITH POINT (cont.)

Wetlands

Wetlands in the general area bounded by Morgan Point, Trout Point, Smith Point, and Frankland Point.

Biological Description

Enclosed shallow bay and bay margin habitats, high turbidity, away from river influence, reduced species diversity. Saltwater marsh along shore.

Oyster Reefs

Extensive oyster reefs at Red Fish Bar and Red Fish Reef; also several scattered in Trinity Bay.

Rookeries

Rookeries Th-1 and Th-2 at Vingt-et-un Islands; Th-3 and Th-4 along Trinity River Channel.

Mangroves

No data

Parks, Wildlife Refuge Areas

The Vingt-et-un Islands area, leased to the National Audubon Society, is managed as a bird sanctuary.

State Tracts of Archeological Interest

Not applicable

18. LAKE STEPHENSON N2930-W9437.5/7.5

Pipelines

G-4067-2 7/8"	Total Petroleum
G-2908-6"	Seagull Pipeline Co.
O/G-1945-2½" (2)	Humble Oil
O/G-2768-4"	Exxon
O/G-3589-3" & 4"	Robert Mosbacher
O/G-3908-2" & 3"	Robert Mosbacher

Beach Erosion/Accretion
Not applicable

Channels
Trinity River Channel

Dunes
Not applicable

Surface Sediments
Mud, sandy mud, small area of sandy muddy shell in Trinity Bay. East Bay with sand and muddy sand nearshore changing to mud and shelly mud in bay.

Wetlands
Wetlands are north and south of State Highway 562.

Biological Description
Shallow, soft-bottomed bay habitat with oyster reefs. Alongshore brackish to freshwater marshes; some recently inundated areas.

Oyster Reefs
Extensive oyster reefs in East Bay.

Rookeries
Rookeries Ti-1 and Ti-2 near Trinity River Channel; Ti-3 near Lake Surprise.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

19. FROZEN POINT N2930-W9430/7.5

Pipelines
G-2824-6" Allied Chemical Corp.

Beach Erosion/Accretion
A zone of erosion at 0-10 ft./yr.

Channels
GIWW

Dunes
Some dunes near Caplen, stablized by vegetation.

Surface Sediments
Mud, sandy mud, muddy sand, sand, and one area of muddy shell near oyster reefs.

Wetlands
Large areas of wetlands at Willow Marsh and bayside of Bolivar Peninsula.

Biological Description
Open bay, shallow, high turbidity, soft-bottomed; bay margins include saltwater marshes, tidal creeks. Upland with brackish to freshwater marshes and large areas of prairie grasslands.

Oyster Reefs
One large and a few smaller oyster reefs scattered west of Ghost Bayou and Big Pasture Bayou.

Rookeries
Part of rookery Tk-1 located near Rollover Bay

Mangroves
No data

Parks, Wildlife Refuge Areas
Anahuac National Wildlife Refuge

State Tracts of Archeological Interest
Not applicable

20. HIGH ISLAND N2930-W9422.5/7.5

Pipelines
No data

Beach Erosion/Accretion
A zone of erosion at 0-10 ft./yr. but most of beach eroding at 10-20 ft./yr.

Channels
GIWW

Dunes
Areas above 5 ft. contour stabilized by vegetation but little, if any, dune structure. Four blowout and three washover areas close to existing developments.

Surface Sediments
Sand beach changing to mud offshore; one area of relict stiff mud.

Wetlands
Large areas along Oyster Bayou to Mud Bayou and along East Bay Bayou.

Biological Description
Gulf beach and enclosed bay, bay margin habitats; extensive areas of brackish and freshwater marshes; some prairie grasslands upland.

Oyster Reefs
No data

Rookeries
Rookery Tk-1 in Rollover Bay vicinity

Mangroves
No data

Parks, Wildlife Refuge Areas
Anahuac National Wildlife Refuge

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
115s
State tracts with twentieth century shipwrecks:
137s

21. MUD LAKE N2930-W9415/7.5

Pipelines

G-3381-20"	Seagull Pipeline Corp.
G-2005-4½"	King Resources Co.
O/G/W-445-4"	No data

Beach Erosion/Accretion
Erosion of beach at 10-20 ft./yr.

Channels
GIWW

Dunes
Areas stabilized by vegetation above 5 ft. contour, but dune structure is minimal.

Surface Sediments
Sand beach, usually mud or sandy mud offshore; some areas of shelly mud, muddy shell and sandy shell. Many areas of relict stiff muds.

Wetlands
Wetland area along GIWW and to gulf beach.

Biological Description
Gulf beach habitat, extensive brackish to freshwater marshes inland.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
101s
115s
State tracts with twentieth century shipwrecks:
122s
30L-1Q

22. SOUTH OF STAR LAKE N2930-W9407.5/7.5

Pipelines

G-1852-12"	United Gas Pipeline Co.
O/G-3551-8"	The Kilroy Company of Texas
G-2018-12"	Pennzoil Pipeline Co.
G-3381-20"	Seagull Pipeline Co.
O-2421-4½"	Chevron Oil Co.
G-1572-3"	Occidental Petroleum Corp. (expired)
O/G-1571-2½" & 4½"	Occidental Petroleum Corp. (expired)
G-1827-16"	United Gas Pipeline Co.
O-1816-8 5/8"	Atlantic Richfield Co.

Beach Erosion/Accretion
Zones of erosion at 10-20 ft./yr.

Channels
No data

Dunes
No data

Surface Sediments
Sand beach changing to mud, sandy mud, and shelly mud offshore; many areas of relict stiff muds beyond 18 ft. deep. Inactive and potentially active faults in tracts 7L, 79s-65s.

Wetlands
Wetlands are located inshore from beach.

Biological Description
Gulf beach habitat changing to brackish to freshwater marshes inland.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
62s
64s
65s
State tracts with twentieth century shipwrecks:
30L-1Q

23. TEXAS CITY N2922.5-W9452.5/7.5

Pipelines

W-2813-16"	Gulf Coast Waste Disposal Authority
O/G-3274-6 5/8"	Houston Oil & Mineral Corp.
O/G-3278-6 5/8"	Texas Electric Service Co.
O/G-3287-12"	Seagull Pipeline Co.
O/G-3272-6 5/8"	Houston Oil & Minerals Corp.
O/G-3273-6 5/8"	Houston Oil & Minerals Corp.
O/G-1976-18"	Pan American Gas Co.
O/G-1809-24"	Florida Gas Transmission Co.
O-2238-10"	Humble Oil Co.

Beach Erosion/Accretion
Not applicable

Channels
Texas City ship channel and turning basin
Dickinson Bay Channel

Dunes
Not applicable

Surface Sediments
Mud, sandy mud, muddy sand and sand near Texas City; shelly sand near reefs off of Eagle Point.

Wetlands
Wetlands adjoining and around Moses Lake, Dollar Bay, Moses Bayou, Dickinson Bayou, and Salt Bayou.

Biological Description
Enclosed shallow bay and bay margin habitats. Oyster reefs present. Saltwater and some brackish-water marshes along shorelines. Much of upland area is urban.

Oyster Reefs
See Biological Description.

Rookeries
Rookery Ug-1 in vicinity of Moses Lake.

Mangroves
No data

Parks, Wildlife Refuge Areas
Snake Island, leased to the Houston Audubon Society, is a bird sanctuary.

State Tracts of Archeological Interest
Not applicable

24. PORT BOLIVAR N2922.5-W9445/7.5

Pipelines

(See Appendix D for listing of shorter pipelines near Port Bolivar.)

O/G-3273-6 5/8"	Houston Oil & Minerals Corp.
O/G-3278-6 5/8"	Texas Electric Service Co.
O/G-3397-3½"	Houston Oil & Minerals Corp.
O/G-3473-6 5/8"	Houston Oil & Minerals Corp.
O/G-3468-3½"	Houston Oil & Minerals Corp.
O/G-3762-4"	Houston Oil & Minerals Corp.
O-3693-3"	Houston Oil & Minerals Corp.
O-3763-4"	Houston Oil & Minerals Corp.
O/G-3330-2½"	Houston Oil & Minerals Corp.
O/G-3468-3"	Houston Oil & Minerals Corp.
O/G-3272-6 5/8"	Houston Oil & Minerals Corp.
O/G-3287-12"	Seagull Pipeline Co.
O/G-3274-6 5/8"	Houston Oil & Minerals Corp.
O/G-3398-3½"	Houston Oil & Minerals Corp.
O/G-3281-3½"	Houston Oil & Minerals Corp.
O/G-3464-3½"	Houston Oil & Minerals Corp.
O-3579-6"	The Dow Chemical Co.
O/G-3328-3½"	Houston Oil & Minerals Corp.
O/G-3391-3½"	Houston Oil & Minerals Corp.
O/G-3275-4½"	Houston Oil & Minerals Corp.
O/G-3395-4½"	Houston Oil & Minerals Corp.
O/G-3467-4½	Houston Oil & Minerals Corp.
O/G-3515-4½"	Houston Oil & Minerals Corp.
P-3909	Houston Oil & Minerals Corp.
O-3506-6"	Ensearch Exploration, Inc.
O/G-3396-3½"	Houston Oil & Minerals Corp.
O/G-1976-18"	Pan American Gas Co.
O/G-1809-24"	Florida Gas Transmission Co.
O/G-3759-4" (2)	Hannah Island Gathering System
O-2612-12"	Houston Oil & Minerals Corp.
O/G-4102-4½"	Houston Oil & Minerals Corp.
O/G-4013-4½"	Houston Oil & Minerals Corp.
O/G-3490-4½"	Houston Oil & Minerals Corp.
O-3716-4½"	Houston Oil & Minerals Corp.
O/G-3681-4½"	Houston Oil & Minerals Corp.
G-3950-2 7/8"	Houston Oil & Minerals Corp.
O/G-3585-4½"	Houston Oil & Minerals Corp.
O/G-3678-4½"	Houston Oil & Minerals Corp.
O/G-3692-4½"	Houston Oil & Minerals Corp.
G-2373-4"	Houston Oil & Minerals Corp.
O/G-4026-4½"	Houston Oil & Minerals Corp.

Beach Erosion/Accretion

Not applicable

24. PORT BOLIVAR (cont.)

Channels
Houston Ship Channel
GIWW
Texas City Ship Channel
Trinity River Channel

Note Restricted Area of Galveston Bay for seaplane use.

Dunes
Not applicable

Surface Sediments
Primarily mud and sandy mud, many reef structures associated with sandy and muddy shell. Some areas of sand.

Wetlands
Small areas near Port Bolivar.

Biological Description
Open shallow bay, bay margin habitats, tidal and inlet influences, extensive reef areas. Small saltwater marsh areas on Bolivar Peninsula.

Oyster Reefs
Extensive oyster reefs at confluence of Galveston and East Bays; other scattered reefs, e.g., Halfmoon Shoal.

Rookeries
Rookery Uh-1 in the area of Hanna Reef.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

25. FLAKE N2922.5-W9437.5/7.5

Pipelines

In Galveston Bay:

O/G-3606-2"	Exxon
O-3580-6 5/8" (2) & 4½"	Houston Oil & Minerals Corp.
O/G-3584-4½"	Houston Oil & Minerals Corp.

In Gulf of Mexico:

G-3747-16"	Black Marlin Pipeline Corp.
O-3559-3½" (2), 4½" (2)	Houston Oil & Minerals Corp.
O/G-3407-3½" (8)	Houston Oil & Minerals Corp.
G-3381-20"	Seagull Pipeline Corp.
G-3667-8 5/8"	Seagull Pipeline Corp.
O/G-3412-4½"	Houston Oil & Minerals Corp.
O/G-3408-4½"	Houston Oil & Minerals Corp.
O/G-3411-4½"	Houston Oil & Minerals Corp.
O/G-3409-4½"	Houston Oil & Minerals Corp.
O/G-3410-4½"	Houston Oil & Minerals Corp.
O/G-3538-3" (2)	Texas Parks & Wildlife Dept.
O/G-3714-4" (2)	Houston Oil & Minerals Corp.
O/G-3406-3½"	Houston Oil & Minerals Corp.
O/G-3413-8" & 2 7/8"	Houston Oil & Minerals Corp.

Beach Erosion/Accretion

A zone of erosion at 0-10 ft./yr.
Zones of accretion at 0-10 ft./yr. increasing to 10-20 ft./yr. at west end of Bolivar Peninsula.

Channels

GIWW
Note Seaplane Restricted Area in Galveston Bay.

Dunes

Areas along beach and State Highway 87 stabilized by vegetation between developed areas, usually above the 5 ft. or 10 ft. contour lines.

Surface Sediments

Galveston Bay with sand and muddy sand near bayshore changing to mud, sandy mud and sandy shell in bay.
Gulf with sand beach changing to sandy mud and mud offshore.

Wetlands

Wetlands north and west of Crystal Beach, south and west of Flake.

25. FLAKE (cont.)

Biological Description

Gulf shelf and beach habitat; much urban area. Shallow bay and bay margin habitat with saltwater marshes along shore.

Oyster Reefs

Large number of oyster reefs in the general area of Hanna Reef, Galveston Bay. Other oyster reefs north of Elmgrove Point and Stingaree Point in East Bay.

Rookeries

No data

Mangroves

No data

Parks, Wildlife Refuge Areas

No data

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

170s
171s
184s through 194s
101L-3Q

26. CAPLEN N2922.5-W9430/7.5

Pipelines

G-3747-16"	Black Marlin Pipeline Co.
G-3667-8 5/8"	Seagull Pipeline Corp.
O-2461-2 5/8"	Mitchell Energy Offshore Corp.
G-2470-8"	Natural Gas Pipeline Co.
O-2465-4"	Mitchell Energy Offshore Corp.
3095-2 7/8" (2)	Houston Oil & Minerals Corp.
G-3381-20"	Seagull Pipeline Corp.
G-3715-3"	Mitchell Energy Offshore Corp.

Beach Erosion/Accretion

A zone of erosion at 0-10 ft./yr. extends along most of the beach.

Channels

GIWW

Dunes

Areas stabilized with vegetation along 5 ft. and 10 ft. contours, intermittent with developed areas.

Surface Sediments

Primarily mud, sandy mud and muddy sand in bay. Gulf with sand extending from beach to 1 mile offshore, changing to mud, sandy mud, and a large area of muddy sand, muddy shelly sand.

Wetlands

Remnants of wetlands located along GIWW and bayside of Bolivar Peninsula.

Biological Description

Gulf and gulf beach habitat; somewhat lower species diversity than open gulf. Saltwater marsh areas along GIWW. Shallow bay habitat, reef west of Yates Cove.

Oyster Reefs

See Biological Description.

Rookeries

No data

Mangroves

No data

Parks, Wildlife Refuge Areas

No data

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

143s
147s
157s
99L-4Q

27. VIRGINIA POINT N2915-W9452.5/7.5

Pipelines

G-1220-2½"	Pan American Petroleum Corp.
O/G-1210-2½"	John W. Mecom
G-2040-4"	Clinton Oil Co.
G-2199-8" & 14"	Southern Union Gas
G-2838-12"	Houston Pipeline Co.
O/GW-3804-14	Amoco Oil Co.
G-3916-6"	Houston Pipeline Co.

Beach Erosion/Accretion
Not applicable

Channels
GIWW

Dunes
Not applicable

Surface Sediments
Primarily mud and sandy mud in bays with some shelly mud, muddy and sandy shell. Reefs in West Bay near North Deer Island and South Deer Island.

Wetlands
Wetlands are located near Gangs Bayou, the Deer Islands, Greene Lake, Highland Bayou, Jones Bay and Swan Lake.

Biological Description
Shallow, turbid, soft-bottomed bay with moderate species diversity. Wetlands mostly saltwater marsh areas; some brackish-water marshes and tidal creeks, mixed with prairie grasslands, many urban areas. Reefs in Galveston Bay.

Oyster Reefs
See Biological Description.

Rookeries
Rookeries Vg-1 in Swan Lake area, Vg-2 through Vg-9 on and between Galveston Island and Wilson Point.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

28. GALVESTON N2915-W9445.5/7.5

Pipelines

Gulf of Mexico:

G-3252-6 5/8"	Texas Gas Corp.
O-3089-6 5/8"	Houston Oil & Minerals Corp.

Bays:

W-3590-30"	Galveston County Water Authority
G-3916-6"	Houston Pipeline Co.
G-2838-12"	Houston Pipeline Co.
G-2199-8" & 14"	Southern Union Gas Co.
G-1301-12"	Houston Pipeline Co.
O/G/W-3859 2" & 3" (3)	Mitchell Energy Offshore Corp.

Beach Erosion/Accretion

A zone of erosion along West Beach at 0-10 ft./yr.
Accretion zones along East Beach at 10 ft./yr. to over 20 ft./yr.

Channels

Inner Bar Channel
Houston Ship Channel
Texas City Ship Channel
Galveston Channel
GIWW
Anchorage area at Bolivar Roads

Dunes

Most of beach is replaced by the Galveston seawall. A blowout area exists along East Beach where there is no seawall.

Surface Sediments

Sandy gulf beaches changing to sandy mud and mud offshore. A potentially active fault about 3 miles offshore.
Bay margins of sand; sandy mud, mud, and extensive reefs in bay.

Wetlands

Small areas of wetlands are located on Bolivar Pennisula, Pelican Island, and near the edges of urban areas on Galveston Island.

Biological Description

Open gulf shelf and beach habitats. Tidal inlet to open shallow bays with reef communities. Small areas of saltwater marshes on Pelican Island and around Sydnor Bayou and Horseshoe Lake. Spoil areas near ship channels. Large urban area on Galveston Island. Bolivar Roads is a major exchange between bays and Gulf of Mexico.

Oyster Reefs

See Biological Description.

Rookeries

Rookeries Vh-1 through Vh-4 are in the vicinities of Pelican Island, Bolivar Peninsula and the Texas City Dike.

28. GALVESTON (cont.)

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
215s
221s
229s
241s
State tracts with twentieth century shipwrecks:
148L-1,3Q
State tracts with both historical and twentieth century shipwrecks:
220s
223s
224s

29. THE JETTIES N2915-W9437.5/7.5

Pipelines
No data

Beach Erosion/Accretion
A zone of accretion at East Beach over 20 ft./yr.

Channels
Galveston ship channel (inner and outer bars)
Anchorage area within jetties
Offshore spoil area

Dunes
Little dune structure although some stabilizing vegetation back from beach. A blowout and washover area near south jetty.

Surface Sediments
Sand extending from beach to nearly 2 miles offshore, changing to mud, sandy mud and muddy sand. Some areas of relict stiff muds offshore. Small area of sandy shell, shell and rock fragment gravel near Inner Bar Channel. Three potentially active faults and one inactive fault offshore.

Wetlands
No data

Biological Description
Gulf shelf, beach and inlet habitat; moderate species diversity; a major inlet and migration route to bays and gulf. Dredged material disposal site in gulf.

Oyster Reefs
No data

Rookeries
Rookery Vi-1 located near south jetty.

Mangroves
No data

Parks, Wildlife Refuge Areas
Old Fort San Jacinto on Galveston Island.

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
207s

29. THE JETTIES (cont.)

State tracts with twentieth century shipwrecks:

194s through 197s
201s
208s
209s
211s
218s
225s

State tracts with both historical and twentieth century shipwrecks:

198s
199s
200s
202s through 206s
210s
212s
213s
214s
216s
217s
219s
226s

30. HOSKINS MOUND N2907.5-W9507.5/7.5

Pipelines

G-4020-4½"	General Crude Oil Company
G-3294-2 7/8"	General Crude Oil Company

Beach Erosion/Accretion
Not applicable

Channels
GIWW
Chocolate Bayou

Dunes
Not applicable

Surface Sediments
Surface Sediments are primarily mud, sandy mud and muddy sand.

Wetlands
Wetland areas are in Wharton Bayou, Chocolate Bayou, and New Bayou.

Biological Description
Bay and bay margin habitats with moderate species diversity. Submerged grasses are located along bay margins in West Bay and Chocolate Bay. Shorelines and some inshore areas are saltwater and brackish-water marshes, interspersed with prairie grasslands, small areas of barren land with tidal creeks. Freshwater marshes are further inland. Oysters on spoil mounds along Chocolate Bayou Channel.

Oyster Reefs
See Biological Description.

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

31. SEA ISLE N2907.5-W9500/7.5

Pipelines
G-4020-4½ General Crude Oil Company

Beach Erosion/Accretion
There are alternating zones of erosion at 0-10 ft./yr. and accretion at 0-10 ft./yr. along West Beach.

Channels
GIWW

Dunes
There are stabilized dunes and other vegetated areas above the 5 ft. contour except for the urban areas of Sea Isle and Bay Harbor. One washover area is near Bay Harbor.

Surface Sediments
Bays have sandy shorelines changing to sandy mud and mud with distance from shore. Sandy muddy shell sediment is found in vicinity of reefs at Carancahua Reef and Shell Island. Sand extends from gulf beach to about ½ mile offshore, then sediment is primarily mud.

Wetlands
Wetland areas extend from Carancahua Lake to Chocolate Bay. Other areas are Galveston Island bayside from Bird Island Cove to Snake Island Cove.

Biological Description
Gulf shelf and beach habitat with high species diversity. Bays and bay margins are shallow, with varying degrees of species diversity and large areas of submerged grasses along bay shorelines to 1 mile bayward. Saltwater, brackish, and freshwater marshes intermingled with sand flats.

Oyster Reefs
See Surface Sediments.

Rookeries
Rookeries Wf-1 and Wf-2 are located at Snake Island and near Bay Harbor, respectively.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
No data

32. LAKE COMO N2907.5/W9452.5/7.5

Pipelines
O/G/W-3804-14" Amoco Oil Company

Beach Erosion/Accretion
A zone of erosion at 0-10 ft./yr. along beach.

Channels
No data

Dunes
Many areas stabilized by vegetation interspersed among urban areas and five blowout areas.

Surface Sediments
Sand along bay shorelines, changing to sandy mud, shelly mud towards bay center. Reef structures are indicated at Carancahua Reef. Gulf beach sand changes to sandy mud, muddy sand about ½ mile offshore; mud and shelly mud further offshore.

Wetlands
Wetland areas are located along Galveston Island bayside.

Biological Description
Gulf shelf with high species diversity and gulf beach habitat. Shallow bays and bay margins are soft-bottomed, with variable species diversity and submerged grass areas near Galveston Island. Bayside saltwater marshes, bayous; small sand flats near urban areas.

Oyster Reefs
See Surface Sediments.

Rookeries
Rookeries Wg-1 through Wg-4 are located at Melager Cove, Mensell Bayou, Starvation Cove, and Hoeckers Point, respectively.

Mangroves
No data

Parks, Wildlife Refuge Areas
Galveston Island State Park

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
278s

33. OYSTER CREEK N2900-W9515/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
No data

Wetlands
Wetlands are in the vicinity of Salt Bayou, Bastrop Bayou, and Salt Lake.

Biological Description
Landlocked fresh to saline water bodies. Freshwater marsh along Salt Bayou and Bastrop Bayou. Brackish to freshwater marshes around Salt Lake. Upland prairie grasslands and a few small urban areas.

Oyster Reefs
Not applicable

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
Brazoria National Wildlife Refuge

State Tracts of Archeological Interest
Not applicable

34. CHRISTMAS POINT N2900-W9507.5/7.5

Pipelines

Bastrop Bay

0-960-4" Gulf Oil Corporation

Beach Erosion/Accretion

Zones of erosion vary from 0-10 ft./yr., to 10-20 ft./yr., to over 20 ft./yr.

Channels

GIWW

San Luis Pass

Dunes

Areas of beach stabilized by vegetation above 5 ft. contour with exception of five washovers and one blowout.

Surface Sediments

Bays with sandy shorelines, changing to shelly mud, sandy mud and mud toward bay center. Gulf with sand beach changing to muddy sand 1 to 2 miles offshore and to mud further offshore.

Wetlands

Most of the areas around Oyster Lake, Alligator Lake, Cox Lake, Salt Lake, Drum Bay, Christmas Bay, Bastrop Bay and West Bay are wetlands.

Biological Description

Shallow bays, bay margin habitats with soft bottoms, submerged grasses; some moderate species diversity. Adjacent wetlands are primarily salt-water marshes, fresh- to brackish-water marshes further inland. Many spoil areas. Gulf shelf and beach habitat, high species diversity offshore.

Oyster Reefs

No data

Rookeries

Rookeries Xe-1 on Bird Island, Xe-2 on San Luis Island, Yd-2 on Follets Island.

Mangroves

No data

Parks, Wildlife Refuge Areas

Bird Island, under lease to the National Audubon Society, is managed as a sanctuary.

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

330s

State tracts with both historical and twentieth century shipwrecks:

320s

321s

35. SAN LUIS PASS N2900-W9500/7.5

Pipelines
No data

Beach Erosion/Accretion
A zone of erosion along West Beach at 0-10 ft./yr. increasing to 10-20 ft./yr. near San Luis Pass. A zone of erosion on San Luis Island at 0-10 ft./yr.

Channels
San Luis Pass

Dunes
Large vegetated area above the 5 ft. contour from Bay Harbor to end of Galveston Island. One washover along West Beach; two washovers near the very end of Galveston Island.

Surface Sediments
Bay sediments are mostly sandy mud and sand. Gulf surface sediments are sand from beach to over 1 mile offshore, changing to areas of sandy mud, mud, and shelly sandy mud.

Wetlands
Small wetland areas located on bayside of Galveston Island.

Biological Description
Gulf shelf and shoreface habitats. An inlet area, some submerged grasses near bay shoreline of Galveston Island. Upland vegetated with grasses.

Oyster Reefs
No data

Rookeries
Rookery Xf-1 located near Motto.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
299s
State tracts with both historical and twentieth century shipwrecks:
300s
301s
310s through 314s
218L-3Q

78. ST. CHARLES BAY SE N2800-W9645/7.5

Pipelines
Gulf of Mexico
G-3453-3" McMoran Exploration Company

Beach Erosion/Accretion
A zone of erosion at 0-10 ft./yr.

Channels
No data

Dunes
The dunes are well-developed and stabilized by vegetation, but discontinuous with blowout and washover areas.

Surface Sediments
Gulf sediments are sand extending from beach up to 4 miles offshore before changing to muddy sandy, sandy mud, then mud.
Cedar Bayou sediments are sand, sandy mud, and mud.
Mesquite Bay sediments change from sand near shore to muddy sand away from shore.

Wetlands
Wetlands are located between Vinson Slough, Cedar Bayou, and around Mesquite Bay.

Biological Description
There are large areas of grasslands, sand and mud flats, and saltwater marshes between Vinson Slough and Cedar Bayou. Submerged grasses occur in the shallow margins of Mesquite Bay.

Oyster Reefs
No data

Rookeries
Rookery fR-1 is in the vicinity of Cedar Bayou.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
State tracts with twentieth century shipwrecks:
750s
751s
775s

79. GREGORY N2752.5-W9715/7.5

Pipelines
Corpus Christi Bay

G-3341-10 3/4"	Reynolds Pipeline Company
G-3641-2 7/8"	J. L. Hamon

Beach Erosion/Accretion
Not applicable

Channels
La Quinta channel and turning basin

Dunes
No data

Surface Sediments
Bay sediments change from sand alongshore to muddy sand away from shore.

Wetlands
Small wetland areas are along bay margin.

Biological Description
Nueces Bay is shallow, soft bottomed, turbid, and has more freshwater influence than Corpus Christi Bay. Shell ridges are scattered in Nueces Bay. Corpus Christi Bay is similar but more saline, with some areas of submerged grasses. Upland of grasses, wooded areas, urban areas and much agricultural land.

Oyster Reefs
See Biological Description.

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
No data

80. ARANSAS PASS N2752.5-W9707.5/7.5

Pipelines

G-2440-6"	Tennessee Gas Pipeline Company
G-3564-12"	Houston Pipeline Company

Beach Erosion/Accretion
No data

Channels
GIWW
Aransas Channel
Ransom Island Channel

Dunes
No data

Surface Sediments
Sediments of Port Bay are sandy mud and muddy sand.
Sediments of Redfish Bay are muddy shell, sandy shell, and sandy shelly mud.

Wetlands
Wetlands are located in the vicinity of McCampbell Slough and around Port Bay.

Biological Description
Redfish Bay is shallow, has large areas of submerged grasses and scattered oysters. Mangroves do occur in this area. Much made land and urban areas. Saltwater and brackish to freshwater marshes are around Port Bay. Upland of prairie grasslands, scrub brush and wooded areas.

Oysters
See Biological Description.

Rookeries
Rookeries gP-3 and gP-4 are along the GIWW near Conn Brown Harbor.
Rookery hO-5 is on Ransom Island.

Mangroves
See Biological Description.

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

81. ESTES N2752.5-W9700/7.5

Pipelines

Corpus Christi Bay

G-2440-6"	Tennessee Gas Pipeline Company
G-3564-12"	Houston Pipeline Company
G-3882-2½"	H. E. Hunt Estate
G-1449-2 7/8"	Socony Oil Corporation
G-1563-12"	Lo-Vaca Gathering Company

Redfish Bay

O/G-3676-3½"	Tamarack Petroleum Company, Inc.
O-2519-2½"	Culberson Well Service

South Bay

O/G-3611-3½'	Tamarack Petroleum Company, Inc.
O/G-3787-3½"	Tamarack Petroleum Company, Inc.
O/G-3848-3½"	Tamarack Petroleum Company, Inc.
O/G-3620-3½"	Tamarack Petroleum Company, Inc.

Aransas Bay

G-4045-4½"	Florida Gas Transmission Company
G-1805-4"	Florida Gas Transmission Company
G-2164-4"	Lo-Vaca Gathering Company
G-1901-8"	Lo-Vaca Gathering Company
G-1966-2 7/8"	King Resources Company
G-1968-2 7/8"	King Resources Company
G-4032-4"	Davis Oil Company
G-1967-2 7/8"	King Resources Company
G-3705-2½"	Getty Oil Company
G-2024-2 7/8"	Getty Oil Company
O/G-3486-8"(2)	Houston Oil & Minerals

Beach Erosion/Accretion

A zone of erosion at 0-10 ft./yr.

Channels

Aransas Channel
GIWW

Dunes

Dunes are active, with large blowout areas and smaller infrequent areas of stabilizing vegetation. Some washover areas also exist.

Surface Sediments

Sediments are scattered areas of mud, sandy mud, shelly mud, sand, muddy sand, shelly sand, and muddy shell, sandy shell near oyster reefs.

Wetlands

Wetlands are located along Harbor Island, Traylor Island, Mud Island, and smaller areas of Hog Island and Lydia Ann Island.

Biological Description

Bays are shallow and have many large areas of submerged grasses. Scattered oysters and oyster ridges also occur, particularly in the vicinity of Harbor Island and Mud Island. Bay margins characterized

by saltwater marshes, sand and mud flats, and berms. Much made land, upland prairie grassland, and some urban areas.

Oyster Reefs
See Biological Description.

Rookeries
Rookeries gP-1, gP-2, gP-3, gP-4, gP-5, and gP-7 are located throughout the Redfish Bay and Harbor Island area. Rookery gP-6 is located on Lydia Ann Island.

Mangroves
An extensive distribution of mangroves occurs in the Redfish Bay area, particularly on and around Harbor Island.

Parks, Wildlife Refuge Areas
Lydia Ann Island, leased to the National Audubon Society, is managed as a bird sanctuary.

State Tracts of Archeological Interest
No data

82. ALLYNS BIGHT N2752.5-W9652.5/7.5

Pipelines

Gulf of Mexico

G-1566-12½"	Lo-Vaca Gathering Company
O-4112-3½" & 10½"	Corpus Christi Oil & Gas Company

Aransas Bay

G-4045-4½"	Florida Gas Transmission Company
G-1805-4"	Florida Gas Transmission Company
G-4032-4"	Davis Oil Company

Beach Erosion/Accretion

There is a zone of erosion at 0-10 ft./yr.

Channels

No data

Dunes

There is a well-developed, vegetated, continuous dune ridge from northern limit of map to near Fairmont Ranch. From this point south the stabilized dune areas are interspersed with blowout areas. Three blowout areas occur near the bayside of St. Joseph Island.

Surface Sediments

Gulf sediments are sand to 4 miles offshore, then change to muddy sand, sandy mud, and mud with increasing depth. A potentially active fault runs parallel to the beach about 4 miles offshore. Inactive faults are parallel and perpendicular to the beach from 2 to 5 miles offshore. Bay sediments change from sandy shorelines to some muddy sand and mud away from shore.

Wetlands

Wetland areas are located on Mud Island and are adjacent to Allyns Lake.

Biological Description

Gulf shelf, beach, and barrier island habitats. St. Josephs Island has large areas of grasslands, sand flats, dunes, and berms near bay shoreline.

Aransas Bay is open, shallow, with moderate salinity, soft sediment, many submerged grasses. Bay margins have saltwater marshes and mud flats.

Mangroves occur in this area.

Oyster Reefs

No data

Rookeries

No data

Mangroves

See Biological Description.

82. ALLYNS BIGHT (cont.)

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
State tracts with twentieth century shipwrecks:
798s
693L - 3Q
721L - 1Q

83. ANNAVILLE N2745-W9730/7.5

Pipelines
0-2955-8" Sun Pipeline Company

Beach Erosion/Accretion
Not applicable

Channels
Viola Channel
Nueces River

Dunes
Not applicable

Surface Sediments
Sediments in Nueces Bay are muddy sand and muddy shelly sand.

Wetlands
Wetland areas are adjacent to Nueces Bay.

Biological Description
Saltwater and brackish to freshwater marshes border the Nueces River, along with low fluvial areas. Uplands contain grasses, scrub woods, as well as urban and agricultural areas.

Oysters Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

84. CORPUS CHRISTI N2745-W9722.5/7.5

Pipelines

O-1675-8"(2)	Coastal States Crude Gathering Company
O-3870-8"	Coastal States Crude Gathering Company
G-2791-2½"	Cities Service Oil Company
G-3576-12 3/4"	Florida Gas Trans. Company
O/G-3563-3½"	Mobil Oil Corporation
O/G-3785-2 7/8"	Teal Petroleum Company
4100-6"	Permian Corporation
O/G-3547-6"	Sun Pipeline Company
O-2522-8 5/8"	Champlin Petroleum Company
G-731-2½"	Texaco, Inc.
O-735-3"	Texaco, Inc.
O/G-3388-8"	Arco Pipeline Company
G-2877-14"	Valley Pipelines, Inc.
O-2903-6"	Coastal States Crude Gathering Company
W-1920-6 5/8"	Atlantic Richfield Company
O-2949-2½"	Coastal States Crude Gathering Company
G-3156-8"	Coastal States Crude Gathering Company
O-2159-3" & 6"	Coastal States Crude Gathering Company
O-2763-8 5/8"	Sun Pipeline Company
O-1906-12"	Coastal States Crude Gathering Company
G-3037-12"(2)	Atlantic Richfield Company
G-2324-4"(2)	Atlantic Richfield Company
O-1513-2"	Phillips Petroleum Company
O-1513-1¼"	Phillips Petroleum Company
G-2356-6"	Phillips Petroleum Company
G-2554-10"	United Gas Pipeline Company
O-1121-2"	Phillips Petroleum Company
O-3650-2" & 3"	Phillips Petroleum Company
G-3449-30"	Texas Eastern Trans. Corporation
O/G-3646-2"	Phillips Petroleum Company
O-2308-8"	Humble Pipeline Company
O-772-8"	Humble Pipeline Company
O-1131-16"	Humble Pipeline Company
G-748-2"	Phillips Petroleum Company
O-615-2"	Phillips Petroleum Company
G-1979-10 3/4"	Nueces Industrial Gas Company
O-2955-8"	Sun Pipeline Company
G-1121-2"	Phillips Petroleum Company
O-1514-2"	Phillips Petroleum Company
O-1121-2" & 3"	Phillips Petroleum Company

Beach Erosion/Accretion

Not applicable

Channels

Corpus Christi Channel and turning basins

Dunes

Not applicable

84. CORPUS CHRISTI (cont.)

Surface Sediments

Nueces Bay contains mostly mud, sandy shell, muddy sand, and some sandy shelly mud. Corpus Christi Bay contains mud, sand, and muddy sand.

Wetlands

Wetlands are along Nueces River, and Nueces Bay near Whites Point.

Biological Description

Nueces Bay is a river-influenced bay, shallow, turbid, with marsh areas near the mouth of the Nueces River. Shell reefs occur in the bay. The bay margin includes sand flats and marshes. Corpus Christi Bay is similar, but with higher salinity, greater species diversity. Upland areas are predominantly urban.

Oyster Reefs

See Biological Description.

Rookeries

No data

Mangroves

No data

Parks, Wildlife Refuge Areas

No data

State Tracts of Archeological Interest

Not applicable

85. PORTLAND N2745-W9715/7.5

Pipelines

Nueces Bay

0-3870-8"	Coastal States Crude Gathering Company
0-3038-2" (2)	Forest Oil Company
4035-4"	Forest Oil Company
4" & 2½"	
2"(4)	

Nueces Bay and Corpus Christi Bay

G-2791-2½"	Cities Service Oil Company
G-1522(3576)-12 3/4"	Florida Gas Trans. Company

Corpus Christi Bay

(See Appendix G for a listing of shorter pipelines in Corpus Christi Bay)

G-3886-6"	Florida Gas Trans. Company
G-1962-4" & 10"	Houston Pipeline Company
G-3385-2½"	Cities Service Oil Company
G-3391-2½"(2)	Houston Oil & Minerals Corporation
3967-2½"	Cities Service Oil Company
G-1743-2½"	Atlantic Richfield Company
G-3436-2 7/8"	Anadarko Production Company
G-2168-2½"	Cities Service Oil Company
0-2946-4½"	McMoran Exploration Company
G-3046-4½"	McMoran Exploration Company
G-2895-12 3/4"	Houston Pipeline Company
0/G-3749-2½"(2)	Cities Service Oil Company
G-1461-2½"(2)	Atlantic Richfield Company
0-1495-2½"(2)	Humble Oil & Refining Company
G-1460-2½"(2)	Atlantic Richfield Company
G-1962-4" & 6"	Houston Pipeline Company
G-3371-3"	Tennessee Gas Pipeline
G-3293-2½"	J. L. Hamon
G-3292-3"	J. L. Hamon
0-4066-2½"	C. B. Marino
0-3383-2½"	Cities Service Oil Company
0-1438-2½"	Cities Service Oil Company
G-1371-3½"	Atlantic Refining Company
0-1498-2½"	Cities Service Oil Company
G-3493-2 7/8"	J. L. Hamon
0-3382-2½"	Cities Service Oil Company

Beach Erosion/Accretion

Not applicable

Channels

Corpus Christi Channel

Dunes

Not applicable

Surface Sediments

No data

85. PORTLAND (cont.)

Wetlands
No data

Biological Description
Open bay habitat with moderate salinity (10-35 o/oo) fluctuating with rainfall; depth 4-15 ft. Sand beach, soft substrate, shell reefs. Urban area upland.

Oyster Reefs
See Biological Description.

Rookeries
Rookery hN-1 is in the area along the causeway in Nueces Bay.
Rookery hO-6 is in the vicinity of Donnel Reef in Corpus Christi Bay.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

86. PORT INGLESIDE N2745-W9707.5/7.5

Pipelines

Corpus Christi Bay

0/G-241-2"(2)	Humble Pipeline Company
0-3279-2 7/8"	C. B. Marino
0-3883-3"	Cities Service Company
G-1541-12"	United Gas Pipeline Company
0-2735-2"	Sun Oil Company
0-2724-2"	Sun Oil Company
G-3704-2½"(3) & 3"	Getty Oil Company
G-3897-6"	United Gas Pipeline Company
G-2058-12"	Tennessee Gas Pipeline Company
HC-3675-4½"	Sun Oil Company
0-1200-6 5/8"	Sun Oil Company
0-1200-2½"	Sun Oil Company
0/G-3901-4½"	Sun Oil Company
G-3876-12"	United Gas Pipeline Company
G-2349-6"	United Gas Pipeline Company
0-4172-2"	Sun Gas Company
0-1820-2½"	Sun Gas Company
0-3034-2½"	Energy Reserve Group, Inc.
G-282-2½"	Pasotex Pipeline Company
0-867-2½"(2)	Sunray DX Oil Company
0-2770-3"	Getty Oil Company
0-3036-2½"	Energy Reserve Group, Inc.
0-1040-3"	Pan American Petroleum Company
0-1039-2½"	Pan American Petroleum Company
0-3035-6"	Energy Reserve Group, Inc.
0-1003-6"	Pan American Petroleum Company
G-2401-4"	United Gas Pipeline Company
0-2488-2"	Shell Oil Company
0/G-3805-6 5/8"	McMoran Exploration Company
0/G-3250-2½"	Shell Oil Company
G-1383-4½"	Shell Oil Company
0-2548-2 7/8"(2)	McMoran Exploration Company

Redfish Bay

G-2563-6 5/8"	McMoran Exploration Company
0/G-3534-3½"	McMoran Exploration Company
G-3596-3½"	McMoran Exploration Company
0/G-3941-2 7/8"	McMoran Exploration Company
G-2347-3"(2)	McMoran Exploration Company
G-2078-6"	United Gas Pipeline Company
G-2280-8"	Channel Industries
0-1512-2"	Phillips Petroleum Company
G-3564-12"	Houston Pipeline Company

Ingleside Cove and Ingleside Point

G-1952-10"	United Gas Pipeline Company
0-1835-2½"	Cities Service Oil Company
0-1837-2½"(2)	Cities Service Oil Company
G-3292-3"	J. L. Hamon
G-3293-2½"	J. L. Hamon

86. PORT INGLESIDE (cont.)

G-3371-12" Tennessee Gas Pipeline Company
(See Appendix F for additional listing of pipelines in this area.)

Beach Erosion/Accretion
Not applicable

Channels
Corpus Christi Channel
GIWW
Ransom Island Channel
La Quinta Channel
Jewell Fulton Canal

Dunes
Not applicable

Surface Sediments
Bay sediments are primarily mud, sandy mud, and muddy sand with sandy shorelines, spoil islands, and some small areas of sandy or muddy shell.

Wetlands
Wetlands are generally located at Redfish Bay and Shamrock Cove.

Biological Description
Bays are shallow to 15 ft. in depth, with moderate salinity (10-35 o/oo), soft sediments, and scattered oysters and shell banks. Mangroves occur in this area. Submerged grasses are in the areas around Live Oak Ridge, Shamrock Island, and in Redfish Bay. Uplands with prairie grasslands, scrub brush, wooded areas, oak mottes and groves, made land, and urban areas.

Oyster Reefs
See Biological Description.

Rookeries
Rookery hO-1 is located at Ingleside Point.
Rookery hO-2 is located on two islands across the GIWW from Live Oak Ridge.
Rookery hO-3 is at Pelican Island.
Rookery hO-4 is in the Shamrock Island area.
Rookery hO-5 is at Ransom Island.
Rookery hO-6 is along La Quinta Channel.

Mangroves
See Biological Description.

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

87. PORT ARANSAS N2745-W9700/7.5

Pipelines

G-1477-12½"	Coastal States Gathering Company
G-1565-12"	Lo-Vaca Gathering Company
G/O-4058-2 7/8"(2)	Mobile Oil Corporation

Beach Erosion/Accretion

There is a zone of erosion on San Jose Island at 0-10 ft./yr.
There is a zone of accretion on San Jose Island at 0-10 ft./yr.
Mustang Island has a zone of erosion at 0-10 ft./yr.

Channels

Corpus Christi Channel
Aransas Channel
Lydia Ann Channel
Aransas Pass

Dunes

Dune structure on San Jose Island is not as well developed as on Mustang Island. A large blowout area with scattered small areas of vegetation characterizes the south end of San Jose Island. Most of the dune ridge on the north end of Mustang Island is well developed and stabilized. A blowout area exists near the south jetty, many blowout areas exist 5 to 7 miles further south.

Surface Sediments

Sand extends from gulf beach to over 2 miles offshore before changing to muddy sand, sandy mud and mud. An inactive fault is parallel to the beach 4 to 5 miles offshore. Bay sediments are predominantly sandy mud and muddy sand, with some areas of sand or mud.

Wetlands

Wetlands are located at Harbor Island and in the East Shore area of Corpus Christi Bay.

Biological Description

There are extensive areas of saltwater marsh, mangroves, oysters, and submerged grasses in the vicinity of Harbor Island and the East Flats of Mustang Island. An area of high productivity. Upland with large expanses of grassland, some made land, and urban areas. Scattered mud flats and sand flats are frequently inundated by wind-tidal action.

Oyster Reefs

See Biological Description.

Rookeries

Rookery hP-1 is in the Harbor Island area.
Rookery hP-2 is along the spoil area by the Corpus Christi Channel near East Flats.
Rookery hP-3 is along the East Shore of Corpus Christi Bay.

87. PORT ARANSAS (cont.)

Mangroves

A unique concentration of mangroves is established at Harbor Island and at the East Shore area of Corpus Christi Bay. Scattered mangroves occur along Corpus Christi Channel and the East Flats.

Parks, Wildlife Refuge Areas

Nueces County Park

State Tracts of Archeological Interest

State tracts with both historical and twentieth century shipwrecks:
847s
849s
854s
856s
857s
858s

88. OSO CREEK NE N2737.5-W9715/7.5

Pipelines

Laguna Madre

(See Appendix H for listing of additional pipelines in this part of Laguna Madre.)

0/G-4105-3½"(2), 6" & 8"	Exxon Corporation
G-3203-2½"	Exxon Corporation
G-2860-2½"	Exxon Corporation
G-2561-5.548"	Reynolds Mining Corporation
0-2450-4½"	McMoran Exploration Company

Corpus Christi Bay

G-2895-12 3/4"	Houston Pipeline Company
0-2946-4½", (G-3046-4½")	McMoran Exploration Company
G-2168-2½"	Cities Service Oil Company
G-3436-2 7/8"	Anadarko Production Company
G-1743-2½"	Atlantic Richfield Company
3967-2½"	Cities Service Oil Company
G-3341-10 3/4"	Reynolds Pipeline Company
G-3886-6"	Florida Gas Trans. Company

Oso Bay

G-1658-6"	Florida Gas Trans. Company
0-779-4"	Humble Pipeline Company
0-2212-6"	Humble Pipeline Company
G-1807-8"	Florida Gas Trans. Company
G-1803-6"	Florida Gas Trans. Company

Beach Erosion/Accretion

Not applicable

Channels

Humble channels in Laguna Madre

Dunes

No data

Surface Sediments

Both bays primarily have sandy shorelines and mud bottoms away from shore. Laguna Madre sediments are sandy mud and muddy sand, with one area of shell and rock fragment gravel.

Wetlands

A few small wetland areas border Oso Bay.

Biological Description

Oso Bay is enclosed, has a large spoil disposal area, is shallow, bordered by sandflats, berms, and frequently flooded fluvial areas. Upland with scrubwoods, urban and agricultural areas. Corpus Christi Bay is open, shallow, turbid, with moderate salinity and an urban shoreline. Laguna Madre is shallow with many areas of submerged grasses. Its shoreline includes made land in urban areas and sand flats.

88. OSO CREEK NE (cont.)

Oyster Reefs
No data

Rookeries
Rookery iN-1 is a 1 x 2 mile area near the Laguna Madre shoreline south of the causeway.
Rookery iN-2 is in Oso Bay between the causeway and Corpus Christi Bay.
Rookery iO-1 is a 3/4 x 1½ mile area near the Laguna Madre shoreline north of the causeway.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

89. CRANE ISLANDS NW N2737.5-W9707.5/7.5

Pipelines

Gulf of Mexico

0/G-3531-6 5/8"	McMoran Exploration Company
G-3533-6 5/8"	McMoran Exploration Company
G-2560-6"	Reynolds Mining Corporation
G-4005-2 3/8" & 4½"	Texaco, Inc.
G-3946-8"	United Gas Pipeline Company
G-1630-8"	United Gas Pipeline Company
G-4109-6"(2)	Gulf Oil Corporation
G-1836-4"(2)	Shell Oil Company
G-2882-6"	Sun Oil Company
G-3414-6"	Energy Reserves Group, Inc.
G-3875-8"	United Gas Pipeline Company

Corpus Christi Bay

G-2058-12"	Tennessee Gas Pipeline Company
G-1541-12"	United Gas Pipeline Company
0-3883-3"	Cities Service Company
0-1068-2½"	Gulf Oil Corporation
G-2909-4½"	Houston Pipeline Corporation
0-2457-4"	Shell Oil Company
0-1027-3"(2)	Gulf Oil Company
0-2457-3"	Shell Oil Company
0-4064-4"	C. B. Marino
0-3279-2 7/8"	C. B. Marino
0-4065-2½"(2)	C. B. Marino
0-1594-2½"	Cities Service Oil Company
G-2895-12 3/4"	Houston Pipeline Company
0-2946-4½"	McMoran Exploration Company
G-3046-4½"	McMoran Exploration Company
0-2450-4½"	McMoran Exploration Company
0-2439-2 7/8"	Petrotex Chemical Corporation
G-2561-5.548"	Reynolds Mining Corporation

Beach Erosion/Accretion

There is a zone of erosion at 0-10 ft./yr.

Channels

GIWW

Dunes

There is a discontinuous line of vegetated dunes, broken by blowouts and washover areas.

Surface Sediments

Sand extends from gulf beach to 1 or 2 miles offshore, then sediment changes to muddy sand.

Corpus Christi Bay sediments change from muddy sand near bay margin to mud toward bay center.

Sediment of this part of the Laguna Madre is primarily sandy mud.

89. CRANE ISLANDS NW (cont.)

Wetlands

Wetlands are located in areas north and south of Fish Pass, around Corpus Christi Pass and Newport Pass.

Biological Description

Corpus Christi Bay and Laguna Madre form an open shallow bay system with moderate salinity, soft substrate, and access to the gulf via Fish Pass. Margins include sand and mud flats, extensive submerged grasses, and possibly some scattered mangroves.

Oyster Reefs

No data

Rookeries

No data

Mangroves

See Biological Description.

Parks, Wildlife Refuge Areas

Mustang Island State Park
Packery Channel Park

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

885s
889s
893s

90. PITA ISLAND N2730-W9715/7.5

Pipelines

G-1697-4"	Texas Eastern Trans. Corporation
O/G-3148-4"	McMoran Exploration Company
G-3545-12"	Texas Eastern Trans. Corporation
G-902-3"	Carre Oil
G-1965-3½"	American Petrofina Company
G-2192-8"	Trunkline Gas Company (abandoned)
G-2217-3"	Humble Oil & Refining Company
G-1879-4½"	Humble Oil & Refining Company
G-1879-6"	Humble Oil & Refining Company
G-1806-6"	Florida Gas Trans. Company

Beach Erosion/Accretion

There is a zone of erosion at 0-10 ft./yr.

Channels

GIWW
Pita Island Channel

Dunes

There is a large blowout area within which are smaller areas of dunes stabilized by vegetation.

Surface Sediments

This portion of the Laguna Madre is predominantly sandy mud and muddy sand with some scattered areas of mud, shelly mud, and sand along shorelines.

Wetlands

No data

Biological Description

Laguna Madre is shallow, subject to temperature extremes, and often hypersaline. There are extensive areas of submerged grasses. Lagoon margins have emergent, submergent sand and mud flats, berms. Upland has grasslands and active dune fields.

Oyster Reefs

No data

Rookeries

Rookeries jN-1 through jN-8 are on spoil islands in the Laguna Madre. Rookery jN-9 is in the Laguna Larga area.

Mangroves

No data

Parks, Wildlife Refuge Areas

Padre Island National Seashore

State Tracts of Archeological Interest

Not applicable

91. CRANE ISLANDS SW N2730-W9707.5/7.5

Pipelines
G-1806-6" Florida Gas Trans. Company

Beach Erosion/Accretion
There is a zone of erosion at 0-10 ft./yr.

Channels
GIWW

Dunes
Stable dune areas are intermittent with blowout areas.
Washover areas exist near Packery Channel.

Surface Sediments
Sand extends from the gulf beach to 4 miles offshore, then sediment changes to muddy sand, then mud. There are three long, overlapping, inactive fault zones, running at angles to the shoreline. Sediments of Laguna Madre are muddy sand, shelly mud, and sandy mud.

Wetlands
There is a limited area of wetlands along Parkroad 22 in the vicinity of Packery Channel.

Biological Description
Gulf shelf and beach habitat. Bays are shallow, soft-bottomed, with submerged grasses, sand flats, and berms along margin. Much made land and urban areas. Prairie grasslands upland.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
No data

92. RIVIERA BEACH NW N2722.5-W9737.5/7.5

Pipelines
G-991-6 5/8" Valley Gas Trans., Inc.

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
Sediment of Cayo del Grullo is sand and muddy shelly sand.

Wetlands
No data

Biological Description
Occasional inundation of part of Cayo del Grullo sand flats; otherwise a hypersaline water body. Berms along shoreline, upland brush and grasses, oak mottes, and scattered small freshwater marshes.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

93. RIVERA BEACH NE N2722.5-W9730/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
No data

Wetlands
No data

Biological Description
Bays contain sand and mud flats which are only occasionally inundated, dependent upon meteorological conditions. Berms along shoreline; upland with prairie grasslands, brushlands, some freshwater marshy areas.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

94. SOUTH BIRD ISLAND NW N2722.5-W9722.5/7.5

Pipelines

G-2174-3½"	R. E. Haas
G-1829-4" & 12"	United Gas Pipeline Company

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
Sediments are sandy mud and muddy sand, with some muddy shelly sand.

Wetlands
Wetlands are along the bay and lagoon margins.

Biological Description
Laguna Madre is shallow, with soft sediments and sparse to moderate areas of submerged grasses. Upland is brushland with grasses and some dunes. Alazan Bay is hypersaline, with some sparse submerged grasses, berms along margin. Laguna Larga and Parra Lake are landlocked. There is occasional inundation of Cayo de Hinoso sand flats. Many small freshwater marshes are scattered in the upland area.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

95. SOUTH BIRD ISLAND N2722.5-W97.15/7.5

Pipelines

Gulf of Mexico	
G-2849-10" (G-3821)	Chevron Oil Company
Laguna Madre	
G-2174-3½"	R. E. Haas
G-1829-4" & 12"	United Gas Pipeline Company
G-2618-10"	Florida Gas Trans. Company
G-1346-4"	Texaco, Inc.
G-3545-12"	Texas Eastern Trans. Corporation
G-1697-4"	Texas Eastern Trans. Corporation

Beach Erosion/Accretion

There is erosion at 0-10 ft./yr. from north to a point south of Malaquite Beach. From here further south there is a zone of accretion at 0-10 ft./yr.

Channels

GIWW

Dunes

A stable dune ridge is well developed, but with frequent blowout areas.

Surface Sediments

Sand extends from gulf beach to as far as 4 miles offshore before being replaced by muddy sand. There is an inactive fault 1 to 2 miles offshore.

Wetlands

No data

Biological Description

Gulf shelf and beach habitat. Padre Island has broad expanses of grasslands with small marshy areas. This part of the Laguna Madre is characteristically shallow, with extensive areas of submerged grasses. Lagoon margin includes sand flats, active dune fields. Upland of loess prairie, grasslands, and sand flats.

Oyster Reefs

No data

Rookeries

Rookeries kN-1 through kN-6 are located in Laguna Madre along the GIWW. Rookery kN-1 is South Bird Island.

Mangroves

No data

Parks, Wildlife Refuge Areas

South Bird Island, leased to the National Audubon Society, is managed as a bird sanctuary.
Padre Island National Seashore

State Tracts of Archeological Interest

No data

96. RIVIERA BEACH N2715-W9737.5/7.5

Pipelines

Laguna de los Olmos	
G-1824-10"	South Texas Natural Gas Gathering Company
Laguna Salada	
G-3860-8"	South Texas Natural Gas Gathering Company
G-3520-4"	South Texas Natural Gas Gathering Company
Cayo del Grullo	
G-991-6 5/8"	Valley Gas Trans. Inc.
O-1067-3"	Central Power & Light Company

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
Bay sediments are primarily mud, with margins of sandy mud, reefs, muddy shelly sand, shelly sand, and sand.

Wetlands
No data

Biological Description
Hypersaline bays, restricted by serpulid reefs and interreef shoals with sparse submerged grasses, little freshwater runoff, margins of sand flats, and berms. Upland grasslands, with loose sand and brushland areas.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

97. KLEBERG POINT N2715-W9730/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
Sediments are primarily mud, muddy shelly sand, reefs and sand.

Wetlands
No data

Biological Description
Restricted hypersaline bays with sparse submerged grasses and several areas of relict serpulid reefs. Margins have sand flats and berms. Upland with grasses, scrub woods, eolian ridges, dunes, and scattered freshwater marshy areas.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

98. POINT OF ROCKS N2715-W9722.5/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
GIWW

Dunes
Not applicable

Surface Sediments
Alazan and Baffin Bays are primarily mud, with margins of muddy sand, muddy shelly sand, and sand. Laguna Madre sediments are primarily mud, sandy mud, muddy sand, and sand.

Wetlands
See Biological Description.

Biological Description
Open bay and lagoon with large areas of submerged grasses, serpulid reefs and shoals along the mouth of Baffin Bay. Sand flats, algal mats, and berms along margin. Inland are dunes, grasses, brushwood areas, and many small freshwater marshes.

Oyster Reefs
No data

Rookeries
Rookeries lM-1, lM-3, and mM-6 are on spoil islands along the GIWW.

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore

State Tracts of Archeological Interest
Not applicable

99. SOUTH BIRD ISLAND SE N2715-W9715/7.5

Pipelines
G-2790-3½" & 1" King Resources Company

Beach Erosion/Accretion
North of Big Ball Hill is a zone of erosion at 0-10 ft./yr.
South of Big Ball Hill is a zone of accretion 0-10 ft./yr.

Channels
No data

Dunes
North of Big Ball Hill there are small areas of stable dune ridge within large blowout areas. South of Big Ball Hill the line of stabilized dunes is nearly continuous except for one blowout area near Little Shell.

Surface Sediments
Sand from gulf beach to as far as 4 miles offshore, then muddy sand, sandy mud, and mud. A potentially active fault is 4 to 5 miles offshore from Little Shell Beach.
The Laguna Madre shoreline is primarily sand.

Wetlands
No data

Biological Description
Gulf shelf and beach habitat. Grasslands and small marshes on Padre Island. Laguna Madre is shallow, hypersaline, with submerged grasses, and adjacent to sand flats on Padre Island.

Oyster Reef
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore

State Tracts of Archeological Interest
State tracts with twentieth century shipwrecks:
985s

100. SARITA 4 NE N2707.5-W9730/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
Baffin Bay sediments are mostly sand along shore changing to muddy sand and mud with increasing distance from shore. Scattered serpulid reefs also present.

Wetlands
No data

Biological Description
Baffin Bay is hypersaline, restricted with scattered relict serpulid reefs. A narrow band of submerged grasses are near shore. Berms, shell, sand flats are along margin. Upland prairie with bunch grasses, scattered oak mottes, brushland, and areas of shifting sand dunes.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

101. YARBOROUGH PASS N2707.5-W9721/7.5x9

Pipelines

Laguna Madre

G-2419-8 5/8"	Florida Gas Trans. Company
G-1899-4½"	Florida Gas Trans. Company
G-2835-6 5/8"	Florida Gas Trans. Company

Beach Erosion/Accretion

There is a zone of accretion at 0-10 ft./yr.

Channels

GIWW

Dunes

There are large stabilized dunes, but the well-developed dune ridge is discontinuous with blowout areas and at least one washover area south of Yarborough Pass.

Surface Sediments

Gulf beach sand extends up to 1½ miles offshore. Laguna Madre sediments are mud, sandy mud, and muddy sand with areas of muddy shelly sand near relict serpulid reefs.

Wetlands

See Biological Description.

Biological Description

Gulf shelf and beach habit. Padre Island has prairie grasslands and active dunes. Lagoon is occasionally hypersaline, has large expanses of submerged grasses, margins with serpulid reefs, sand flats and berms. Upland with grasses, eolian ridges, brushland, and freshwater marshy areas.

Oyster Reefs

No data

Rookeries

No data

Mangroves

No data

Parks, Wildlife Refuge Areas

Padre Island National Seashore

State Tracts of Archeological Interest

State tracts with twentieth century shipwrecks:

1000s
1008s

102. POTRERO CORTADO N2700-W9722.5/7.5

Pipelines
G-2419-8 5/8" Florida Gas Trans. Company

Beach Erosion/Accretion
There is a zone of erosion of 0-10 ft./yr.
There is a zone of accretion at 0-10 ft./yr.

Channels
GIWW
Oil exploration channels

Dunes
The dunes are vegetated and stable. The well developed stable dune ridge is almost continuous except for two small blowout areas and one washover area.

Surface Sediments
Lagoon sediments are mostly sandy mud and sand.

Wetlands
No data

Biological Description
Lagoon is shallow with large areas of submerged grasses, bordered by broad subqaueous and subaerial sand flats. Numerous spoil islands are along the GIWW. Upland with eolian ridges, sand-clay dunes, loose sand, loess prairie, salt-tolerant grasses and oak mottes.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore

State Tracts of Archeological Interest
No data

103. MARIA ESTELLA WELL N2652.5-W9730/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
No data

Wetlands
No data

Biological Description
This western edge of Laguna Madre is principally sand and mud flats which are occasionally inundated. Upland is loess prairie with bunch grasses, scattered areas of brushland, shifting sand dunes, and oak mottes.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

104. POTRERO LOPENO NW N2652.5-W9722.5/7.5

Pipelines

Laguna Madre

G-3019-4"	South Texas Petroleum, Inc.
G-865-3"	McWood Corporation
O-2453-2 7/8"(2)	McMoran Exploration Company
O-2454-2 7/8"	McMoran Exploration Company
G-3429-2 5/8"	Hughes and Hughes
O-2547-2 7/8"	Hughes and Hughes
O/G-3565-2 3/4"	Hughes and Hughes
O-2452-2 7/8"	McMoran Exploration Company
O-2855-6 5/8"	Kilroy Company of Texas
O-2693-2 5/8"(2)	Kilroy Company of Texas
G-2419-8 5/8"	Florida Gas Trans. Company

Beach Erosion/Accretion

There is a zone of erosion at 0-10 ft./yr.

Channels

Petroleum exploration channels

Dunes

The dunes are stabilized in infrequent areas along the ridge-line, among many blowout and washover areas.

Surface Sediments

Sand extends from the gulf beach to about 1 mile offshore. The lagoon sediment is primarily muddy sand.

Wetlands

No data

Biological Description

Broad sand flats, algal mats, inundated at various times depending on meteorological conditions. Upland with eolian ridges, salt-tolerant grasses, clay dunes, loose sand, and loess prairie.

Oyster Reefs

No data

Rookeries

No data

Mangroves

No data

Parks, Wildlife Refuge Areas

Padre Island National Seashore

State Tracts of Archeological Interest

State tracts with historical shipwrecks;

1057s
1058s

105. LOS AMIGOS WINDMILL N2645-W9730/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
The sediment in this portion of Laguna Madre is primarily mud.

Wetlands
No data

Biological Description
Large areas of mud flats which are occasionally inundated, sparse submerged grasses are in a small portion of the Laguna Madre margin. Upland with salt-tolerant grasses, small unmapped clay dunes, sand loess prairie, bunch grasses, scattered brushland, oak mottes, and small areas of shifting sand dunes.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

106. POTRERO LOPENO SW N2645-W9722.5/7.5

Pipelines
G-660-4" McWood Corporation

Beach Erosion/Accretion
Not applicable

Channels
GIWW
Petroleum exploration channels

Dunes
Not applicable

Surface Sediments
Sediments are predominantly mud and sand, with some muddy shelly sand.

Wetlands
No data

Biological Description
The north and east portions of this part of the Laguna Madre are subaqueous and subaerial sand flats; the extent of inundation is dependent on meteorological conditions. The south portion of this area has deeper water, is enclosed and hypersaline, with many areas of submerged grasses. Uplands have small clay dunes, loose sand, loess prairie, and bunch grasses.

Oyster Reefs
No data

Rookeries
Rookeries pM-1 and pM-2 are located on spoil islands near the GIWW.

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore

State Tracts of Archeological Interest
Not applicable

107. POTRERO LOPENO SE N2645-W9715/7.5

Pipelines
No data

Beach Erosion/Accretion
There are three zones of erosion at 0-10 ft./yr. alternating with two areas of no erosion.

Channels
No data

Dunes
Stabilized dune areas are interspersed within large blowout and washover areas.

Surface Sediments
Sand extends from the gulf beach to as far as 3 miles offshore. Sediments then change to sandy mud, muddy sand, muddy shelly sand, and mud.

Wetlands
No data

Biological Description
Gulf shelf and beach habitat. The island has large areas of shifting sand, smaller areas of grassland, and sand flats leading to the lagoon.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore

State Tracts of Archeological Interest
State tracts with both historical and twentieth century shipwrecks:
1085s

108. SOUTH OF POTRERO LOPENO NW N2637.5-W9722.5/7.5

Pipelines
G-1964-3" Occidental Petroleum Corporation
G-660-4" McWood Corporation

Beach Erosion/Accretion
Not applicable

Channels
GIWW
Petroleum exploration channels

Dunes
Not applicable

Surface Sediments
Sand along shorelines and near shore, changing to muddy sand and muddy shelly sand.

Wetlands
No data

Biological Description
Lagoon center away from tidal or river influence, 4-12 ft. deep, hypersaline, with submerged grasses along margins. Shoreline with berms clay dunes, bunch grasses, loose sand, and loess prairie. Upland of prairie grasslands and wooded areas; some scattered active dunes.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore

State Tracts of Archeological Interest
Not applicable

109. SOUTH OF POTRERO LOPENO NE N2637.5-W9715/7.5

Pipelines
No data

Beach Erosion/Accretion
There are alternating zones of erosion 0-10 ft./yr. and 10-20 ft./yr.

Channels
No data

Dunes
The areas of dunes stabilized by vegetation are infrequent. Most of the dunes are inactive blowout areas. There are eight washover areas.

Surface Sediments
Sand extends from the gulf beach to 2 to 5 miles offshore, then sediments change to muddy sand and muddy shelly sand.

Wetlands
No data

Biological Description
Gulf shelf and beach habitat. There are infrequent areas of grasslands on Padre Island. Expansive areas of shifting sand and sand flats exist on the western side. The lagoon near Padre Island is shallow with some areas of submerged grasses and large tidal flats.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore

State Tracts of Archeological Interest
State tracts with twentieth century shipwrecks:
1100s
1104s
1111s

110. PORT MANSFIELD N2630-W9722.5/7.5

Pipelines
0/G-3115-8 5/8" Mobile Oil Corporation

Beach Erosion/Accretion
Not applicable

Channels
GIWW
Port Mansfield Channel

Dunes
Not applicable

Surface Sediments
Mostly muddy sand to muddy shelly sand with some areas of mud, sandy mud, and sand.

Wetlands
No data

Biological Description
Lagoon center with some tidal influence; shallow, soft sediments, with sand, oolites, and uninterrupted zones of submerged grasses along east and west margins. Shorelines with berms, and clay-sand dunes. Upland with sandflats, loess prairie, bunch grasses, scattered oak mottes, and a small urban area.

Oyster Reefs
No data

Rookeries
Rookeries rM-1, rM-2, rM-3 and sM-1 are on spoil islands south of and around the intersection of the Port Mansfield Channel and the GIWW.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

111. SOUTH OF POTRERO LOPENO SE N2630-W9715/7.5

Pipelines
Gulf of Mexico and Laguna Madre
0/G-3115-8 5/8" Mobil Oil Corporation

Beach Erosion/Accretion
There are alternating zones of erosion at 0-10 ft./yr. and 10-20 ft./yr. There is a small zone of accretion just south of the south jetty.

Channels
Port Mansfield Channel

Dunes
There is a continuous blowout area north of the Port Mansfield cut. There are only a few areas of stabilized dunes south of the Port Mansfield cut. There are also eight washover areas.

Surface Sediments
Gulf sediments are primarily sand and muddy sand, with two spoil disposal areas.
Lagoon sediments are sand, muddy sand, and shelly sand.

Wetlands
No data

Biological Description
Gulf shelf and beach habitat. Padre Island has scattered patches of grass, active dunes, and washover channels. Lagoon center is influenced by tides via Port Mansfield cut. There are extensive areas of submerged grasses in shallow water. Large sand and mud flats on west side of Padre Island are subject to inundation.

Oyster Reefs
No data

Rookeries
Rookery rN-1 is located among spoil islands along Port Mansfield Channel.

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore

State Tracts of Archeological Interest
State tracts with historical shipwrecks:
1139s

State tracts with twentieth century shipwrecks:
1118s

111. SOUTH OF POTRERO LOPENO SE (cont.)

State tracts with both historical and twentieth century shipwrecks:
1124s
1127s

112. HAWK ISLAND N2622.5-W9722.5/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
GIWW

Dunes
Not applicable

Surface Sediments
Sediments in Laguna Madre are mostly sandy mud, with some areas of mud, sandy shelly mud, and muddy shelly sand.

Wetlands
No data

Biological Description
Lagoon is shallow with margins of dense submerged grasses, large sand flats and mud flats which are occasionally inundated. Upland of semi-arid prairie grasslands, scrub brush, occasional poorly drained depressions, and cultivated land.

Oyster Reefs
No data

Rookeries
Rookery sM-1 is among the spoil islands along the GIWW.

Mangroves
No data

Parks, Wildlife Refuge Areas
Laguna Atascosa National Wildlife Refuge

State Tracts of Archeological Interest
No data

113. GREEN ISLAND N2622.5-W9715/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
GIWW

Dunes
The dunes are not stabilized except for scattered small areas within a large blowout area. There is at least one washover area.

Surface Sediments
Primarily sand and muddy sand, with many smaller areas of sandy mud, muddy shelly sand, sandy shelly mud, and mud.

Wetlands
No data

Biological Description
Laguna Madre has continuous areas of submerged grasses except for shorelines and spoil areas. Sand and mud flats along shoreline, leading to active dunes, eolian ridge and sand-clay dunes upland.

Oyster Reefs
No data

Rookeries
Rookery sN-1 is among spoil islands of the GIWW.
Rookery sN-2 is on Green Island.

Mangroves
No data

Parks, Wildlife Refuge Areas
Padre Island National Seashore
Laguna Atascosa National Wildlife Refuge
Green Island, leased to the National Audubon Society, is managed as a bird sanctuary.

State Tracts of Archeological Interest
Not applicable

114. NORTH OF PORT ISABEL NW N2622.5-W9707.5/7.5

Pipelines

0/G-3115-8 5/8"	Mobil Oil Corporation
0-2933-4½"(3)	Mobil Oil Corporation

Beach Erosion/Accretion

Most of the beach is eroding at 0-10 ft./yr. One portion (south) is eroding at 10-20 ft./yr.

Channels

No data

Dunes

The dunes are stabilized only in small scattered areas with a continuous blowout with many washover areas.

Surface Sediments

Sand, sandy mud, and muddy sand. Small areas of mud, shelly mud, and shell and rock fragment gravel. Occasional relict stiff muds. Four inactive fault zones, 1 to 5 miles offshore, at angles to the beach. One potentially active fault is parallel to the beach, 4 to 5 miles offshore.

Wetlands

No data

Biological Description

Gulf shelf and sand beach habitat. Most of Padre Island is covered with active dune fields from the gulf beach to the sand flats adjoining Laguna Madre. There are scattered areas of vegetation behind the fore-island dunes.

Oyster Reefs

No data

Rookeries

No data

Mangroves

No data

Parks, Wildlife Refuge Areas

No data

State Tracts of Archeological Interest

State tracts with historical shipwrecks:

1139s
1153s

State tracts with twentieth century shipwrecks:

1149s

115. THREE ISLANDS N2615-W9715/7.5

Pipelines

G-2725-3½"	Padre Resources, Inc.
O/G-2646-4"	Exxon Company USA
G-3288-3½"	Seagull Pipeline Corporation
G-986-4"	Humble Oil & Refining Company
G-3629-6 5/8"	Seagull Pipeline Corporation

Beach Erosion/Accretion
Not applicable

Channels
Arroyo Colorado Cutoff
GIWW
Petroleum exploration channels

Dunes
Not applicable

Surface Sediments
Mostly sand, muddy sand, sandy mud; smaller areas of sandy shelly mud and mud.

Wetlands
No data

Biological Description
Lagoon is shallow and has dense submerged grasses throughout except for spoil areas and near shorelines. Uplands with sand flats, saline grasslands, active dunes, and scrub woods.

Oyster Reefs
No data

Rookeries
Rookeries tN-1, tN-2, and uN-1 are located among the spoil islands along the Arroyo Colorado and the GIWW.

Mangroves
No data

Parks, Wildlife Refuge Areas
Laguna Atascosa National Wildlife Refuge
The Three Island area, leased to the National Aududon Society, is managed as a bird sanctuary.

State Tracts of Archeological Interest
Not applicable

116. NORTH OF PORT ISABEL SW N2615-W9707.5/7.5

Pipelines
Laguna Madre
G-2725-3½" Padre Resources
G-3629-6 5/8" Seagull Pipeline Corporation

Beach Erosion/Accretion
Zones of erosion range from 0-10 ft./yr. and 10-20 ft./yr. to over 20 ft./yr.

Channels
No data

Dunes
This section of coastline is characteristically a blowout area with many washover areas. Only small isolated areas of stabilized dunes are present.

Surface Sediments
Beach and gulf sediments are largely sand, muddy sand, some sandy mud and relict stiff muds. There are two long faults, portions of each both inactive and potentially active, running at angles to and parallel to the shoreline, 1-5 miles offshore.

Wetlands
No data

Biological Description
Gulf shelf and beach habitat. The lagoon has a dense distribution of submerged grasses. The lagoon side of Padre Island is characterized by sand flats, active dunes, and washover channels leading to the beach. There are a few grassland areas.

Oyster Reefs
No data

Rookeries
No data

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
State tracts with twentieth century shipwrecks:
1162s

117. LA COMA N2607.5-W9715/7.5

Pipelines
G-2406-2½" Gulf Oil Corporation
G-2406-6 5/8" Gulf Oil Corporation

Beach Erosion/Accretion
Not applicable

Channels
No data

Dunes
Not applicable

Surface Sediments
Mostly sandy mud. Smaller areas of sand, mud, and sandy shelly mud.

Wetlands
No data

Biological Description
The Laguna Madre is an almost continuous area of submerged grasses on both sides of the GIWW. The shoreline is marked by sand flats, eolian ridges, and active sand-clay dunes. Saline grasslands are further inland.

Oyster Reefs
No data

Rookeries
Rookery uN-1 is located along the GIWW on several spoil islands.

Mangroves
No data

Parks, Wildlife Refuge Areas
Laguna Atascosa National Wildlife Refuge

State Tracts of Archeological Interest
Not applicable

118. PORT ISABEL NW N2607.5-W9707.5/7.5

Pipelines
No data

Beach Erosion/Accretion
Zones of erosion at 0-10 ft./yr. and 10-20 ft./yr. exist.

Channels
GIWW

Dunes
There are scattered stabilized dunes in a predominantly blowout area with many washovers.

Surface Sediments
Gulf sediments are sand from beach to 1 or 2 miles offshore, changing to muddy sand and sandy mud.

Wetlands
No data

Biological Description
Gulf shelf and beach habitat. Laguna Madre is open, with tidal influence and lower salinity along the GIWW. Predominantly a submerged grasses area in shallow water bordering the sand flats of Padre Island. Padre Island has scattered areas of grasses and large areas of active sand dunes and washover channels. Urban area extends south from Andy Bowie State Park.

Oyster Reefs
No data

Rookeries
Rookery v0-1 is located on spoil islands along the GIWW.

Mangroves
No data

Parks, Wildlife Refuge Areas
Andy Bowie State Park

State Tracts of Archeological Interest
State tracts with twentieth century shipwrecks:
1189s
1196s
1197s

State tracts with both historical and twentieth century shipwrecks:
1211s

119. LAGUNA VISTA N2600-W9715/7.5

Pipelines
No data

Beach Erosion/Accretion
Not applicable

Channels
Brownsville Ship Channel

Dunes
Not applicable

Surface Sediments
Primarily sandy mud and muddy sand.

Wetlands
No data

Biological Description
Shallow lagoon with tidal influence, and extensive areas of submerged grasses along margins. Sand flats and berms are along shoreline. Upland with salt-tolerant grasses, easily flooded fluvial areas, land-locked bodies of water, poorly drained depressions, some made land, and small urban areas.

Oyster Reefs
No data

Rookeries
Rookery vN-1 is located in the general vicinity of Laguna Madre.

Mangroves
No data

Parks, Wildlife Refuge Areas
No data

State Tracts of Archeological Interest
Not applicable

120. PORT ISABEL N2600-W9707.5/7.5

Pipelines
No data

Beach Erosion/Accretion
There is a zone of erosion at 0-10 ft./yr. north and south of Brazos Santiago Pass.
There is a zone of accretion at 0-10 ft./yr. adjacent to the jetties.

Channels
GIWW
Brownsville Ship Channel

Dunes
There are areas of dunes stabilized by vegetation interspersed with blowout areas on Padre Island. There are larger areas of stable dunes on Brazos Island, but also blowout areas and many washover areas.

Surface Sediments
Gulf sediments are sand from the beach to 1 or 2 miles offshore, then mud, muddy sand, and some shelly sand. There is a spoil disposal area near Brazos Santiago Pass just beyond the jetties. A potentially active fault angles from the beach about 1 mile offshore. Lagoon and bay sediments are sandy mud, mud, and sandy shelly mud.

Wetlands
No data

Biological Description
Lagoon with tidal influence, continuous large areas of dense submerged grasses except for spoil areas. Submerged grasses are also in South Bay. Well established mangrove communities occur here. Upland with sand flats, berms, eolian ridges, grasses, scrub brush, much made land, urban areas.

Oyster Reefs
No data

Rookeries
No data

Mangroves
Good concentrations of mangroves occur
1. around the edges of south Bay,
2. at the intersection of the Brownsville Ship Channel and the Port Isabel Channel,
3. along the eastern shoreline of Long Island, and
4. along the western shoreline of Padre Island near the causeway (particularly between the new and old causeways).

Large concentrations of mangroves also exist inland along state highway 1792 to Port Brownsville.

120. PORT ISABEL (cont.)

Parks, Wildlife Refuge Areas
- Brazos Island State Park
- Isla Blanca State Park

State Tracts of Archeological Interest
- State tracts with historical shipwrecks:
  - 1230s
- State tracts with twentieth century shipwrecks:
  - 1211s
  - 1214s
  - 1217s
  - 1218s
- State tracts with both historical and twentieth century shipwrecks:
  - 1219s
  - 1220s
  - 1223s
  - 1224s
  - 1225s
  - 1226s
  - 1231s

121. MOUTH OF THE RIO GRANDE N2552.5-W9707.5/7.5

Pipelines
No data

Beach Erosion/Accretion
There are zones of erosion at 0-10 ft./yr. and over 20 ft./yr.

Channels
No data

Dunes
The dunes are stabilized by vegetation in scattered areas just north of the Rio Grande. Blowout and washover areas extend north along Boca Chica Beach.

Surface Sediments
Gulf sediments are sand from the beach to about ½ mile offshore, then sandy mud.

Wetlands
No data

Biological Description
Gulf beach, gulf shelf influenced by river delta. Extensive areas of sand flats, saline grasslands, scrub brush and active dune fields inland. Mangroves may occur in this area.

Oyster Reefs
No data

Rookeries
No data

Mangroves
See Biological Description.

Parks, Wildlife Refuge Areas
Brazos Island State Park

State Tracts of Archeological Interest
State tracts with both historical and twentieth century shipwrecks:
1241s
1240s

CONCLUSION

In this study, the General Land Office has described the natural areas on the Texas coast that could be adversely affected by pipeline installation, identified other features of interest to planners of pipeline routes, and consolidated this information on maps.

The goal of the study was to graphically illustrate the state concerns expressed in regulations applicable to pipeline routing and installation and to produce a collection of information that could serve as a convenient tool for pipeline easement applicants. With advance knowledge of the location and characteristics of sensitive areas, industries can plan pipeline routes to minimize adverse environmental effects. It is likely that easement applications prepared after consideration of the state concerns identified in this report can, in most cases, be rapidly processed.

In general, pipeline routes should avoid areas with sensitive natural resources. Primarily, this means areas of high biological productivity such as marshes, mangrove communities, submerged grass beds, and oyster reefs. Special care should be taken in routing pipelines near rookeries, critical dunes, and sites of archeological interest.

When routing conflicts are evident, or when alternative routes are limited, the applicant should work with the staff of the General Land Office (and any other concerned agencies) as early in the planning stages as possible to select the route that would cause least disturbance to sensitive areas.

If, for example, a proposed route were to traverse an area of submerged grasses, the General Land Office staff might be able to help

the applicant locate a suitable path across a smaller segment of this area than originally planned. If a proposed pipeline landfall were in a well developed, vegetated dune area and no other site were feasible, revegetation of the disturbed dune area might be recommended to mitigate adverse impacts.

It is hoped that the products of this study will prove to be a valuable aid not only to industries concerned with pipeline placement, but to those engaged in other types of activities requiring the use of state-owned lands in the coastal area.

By using this report as a reference, project planners may be able to save time and money that would otherwise be spent in replanning a project to conform with state policies, regulations, and guidelines. With both applicants and state reviewers of applications using the information in this report as a guide, conflicts can be minimized and the issuance of coastal permits, leases, and easements expedited.

To be of continuing value, however, this information must be periodically updated and supplemented. If funding becomes available for this effort, an important task would be the filling of gaps in current information. Subsequent revisions would be made to add new pipelines, to map any additional sensitive areas that are identified, and to record changes in other themes.

REFERENCES

Arnold, Barto. Texas Antiquities Committee. 1979. Personal communication.

Blacklock, G. W. et al., compilers. 1978. Texas colonial waterbird census 1973-1976. Austin: Texas Parks and Wildlife Dept. F. A. Report Series No. 15.

Bright, T. J. and L. H. Pequegnat. 1974. Biota of the West Flower Garden Bank. Houston: Gulf Publishing Company.

Bright, T. J. and R. Rezak. 1976. A biological and geological reconnaissance of selected topographic features on the Texas continental shelf. Final report to the BLM, Contract no. 08550-CT5-4. College Station, Texas: Texas A&M Univ., Dept. of Oceanography.

_____. 1978a. Northwestern Gulf of Mexico topographic features study. Final report to the BLM, Contract no. AA550-CT7-15. College Station: Texas A&M Research Found. and Texas A&M Univ., Dept. of Oceanography.

_____. 1978b. South Texas topographical features study. Final report to the BLM, Contract No. AA550-CT6-18. College Station: Texas A&M Research Found. and Texas A&M Univ., Dept. of Oceanography.

Brown, L. F., Jr., project coordinator. In progress. Environmental geologic atlas of the Texas coastal zone. Austin: Univ. of Texas at Austin, Bur. of Economic Geology.

Brown, L. F., Jr., R. A. Morton, J. H. McGowen, C. W. Kreitler and W. L. Fisher. 1974. Natural hazards of the Texas coastal zone. Austin: Univ. of Texas at Austin, Bur. of Economic Geology.

De La Rosa, M. U. S. Army Corps of Engineers, Galveston, Texas. 1979 Personal communication.

General Land Office. 1978. Accessibility and protection of Texas shorefront areas. Austin: General Land Office.

General Land Office Rules 126.18.02.001-.006; 126.30.03.004(b); and 126.30.04.001-004.

McGowen, J. H. and R. A. Morton. 1979. Sediment distribution, bathymetry, faults, and diapirs, submerged lands of Texas. Austin: Univ. of Texas at Austin, Bur. of Economic Geology.

McMillan, C. and L. Sherrod. The Univ. of Texas at Austin, Dept. of Botany. 1979. Personal communication.

Morton, R. A. 1974. Shoreline changes on Galveston Island (Bolivar Roads to San Luis Pass): an analysis of historical changes of the Texas gulf shoreline. Austin: Univ. of Texas at Austin, Bur. of Economic Geology. Geol. Circ. 74-2.

_____. 1975. Shoreline changes between Sabine Pass and Bolivar Roads: an analysis of historical changes of the Texas gulf shoreline. Austin: Univ. of Texas at Austin, Bur. of Economic Geology. Geol. Circ. 75-6.

Morton, R. A. and M. J. Pieper. 1975a. Shoreline changes in the vicinity of the Brazos River delta (San Luis Pass to Brown Cedar Cut): an analysis of historical changes of the Texas gulf shoreline. Austin: Univ. of Texas at Austin, Bur. of Economic Geology. Geol. Circ. 75-4.

_____. 1975b. Shoreline changes on Brazos Island and South Padre Island (Mansfield Channel to mouth of the Rio Grande): an analysis of historical changes of the Texas gulf shoreline. Austin: Univ. of Texas at Austin, Bur. of Economic Geology. Geol. Circ. 75-2.

_____. 1976. Shoreline changes on Matagorda Island and San Jose Island (Pass Cavallo to Aransas Pass): an analysis of historical changes of the Texas gulf shoreline. Austin: Univ. of Texas at Austin, Bur. of Economic Geology. Geol. Circ. 76-4.

_____. 1977a. Shoreline changes on central Padre Island (Yarborough Pass to Mansfield Channel): an analysis of historical changes of the Texas gulf shoreline. Austin: Bur. of Economic Geology. Geol. Circ. 77-2.

_____. 1977b. Shoreline changes on Mustang Island and north Padre Island (Aransas Pass to Yarborough Pass): an analysis of historical changes of the Texas gulf shoreline. Austin: Univ. of Texas at Austin, Bur. of Economic Geology. Geol. Circ. 77-1.

Morton, R. A., M. J. Pieper and J. H. McGowen. 1976. Shoreline changes on Matagorda Peninsula (Brown Cedar Cut to Pass Cavallo): an analysis of historical changes of the Texas gulf shoreline. Austin: Univ. of Texas at Austin, Bur. of Economic Geology. Geol. Circ. 76-6.

Odum, E. P. 1971. Fundamentals of ecology. Philadelphia: W. B. Saunders Co.

Roberts, L. Texas Parks and Wildlife Dept. 1979. Personal communication.

School Land Board Rules 135.16.03.001-.016, 135.18.01.001-.008.

Sorensen, L. O. Pan American Univ., Marine Science Laboratory. 1979. Personal communication.

Texas Natural Resources Code, Sec. 63.121.

U.S. Dept. of the Interior, Bureau of Land Management. 1979. Draft environmental impact statement: proposed 1980 outer continental shelf oil and gas lease sales A62 and 62. Washington, D. C.: U.S. Gov. Printing Office.

APPENDICES

APPENDIX A

Smith Point - Tract 247 Pipelines

0 - 1661 - 2"	Humble Oil and Refining Co.
G - 1180 - 2"	Humble Oil and Refining Co.
0 - 2074 - 2"	Humble Oil and Refining Co.
0 - 2045 - 2"	Humble Oil and Refining Co.
0 - 2460 - 2"	Humble Oil and Refining Co.
0/G - 3003 - 2"	Exxon Co.
0 - 2043 - 2½"	Humble Oil and Refining Co.
0 - 1870 - 2"	Humble Oil and Refining Co.
0 - 2075 - 2½"	Humble Oil and Refining Co.
0 - 2423	Humble Oil and Refining Co.
0 - 3401 - 3"	Exxon Co.
0 - 2415 - 2"	Humble Oil and Refining Co.
0 - 2067 - 2½"	Explorer Pipeline Co.
0 - 1124 - 2"	Texaco Inc.
G - 2084 - 2"	Humble Oil and Refining Co.
G - 3825 - 2"	Exxon Co.
0 - 1507 - 2"	Humble Oil and Refining Co.
0 - 2036 - 2"	Humble Oil and Refining Co.
0 - 2917 - 2"	Exxon Co.
G - 1201 - 2½"	Sinclair Inc.
0 - 1135 - 2"	Humble Oil and Refining Co.
G - 1951 - 2"	Humble Oil and Refining Co.
0 - 2041	Humble Oil and Refining Co.

Smith Point - Tract 247 Pipelines

0 - 2171	Humble Oil and Refining Co.
0 - 2037 - 2"	Humble Oil and Refining Co.
0 - 2181	Humble Oil and Refining Co.
0 - 1579 - 2"	Humble Pipeline
0 - 1626 - 2"	Humble Oil and Refining Co.
0 - 2042 - 2"	Humble Oil and Refining Co.
0 - 2085	Humble Oil and Refining Co.
0 - 3400 - 3"	Exxon Co.
G - 2937 - 2"	Exxon Co.
G - 3174	Exxon Co.

APPENDIX B

Smith Point - Tract 225 Pipelines

O - 3867 - 2"	Exxon Co.
G - 1874	Humble Oil and Refining Co.
G - 1871	Humble Oil and Refining Co.
G - 1872	Humble Oil and Refining Co.
O/G - 3618 - 2½"	Exxon Co.
G - 1140	Humble Oil and Refining Co.
G - 2848 - 2"	Exxon Co.
O - 2984 - 4"	Exxon Co.
O/G - 3254 - 3"	Exxon Co.
G - 3977	Exxon Co.
O - 2077 - 2"	Humble Oil and Refining Co.
G - 1136 - 2"	Humble Oil and Refining Co.
O/G - 2056	Humble Oil and Refining Co.
O - 1137	Humble Oil and Refining Co.
O - 2762	Exxon Co.
O - 1729	Humble Oil and Refining Co.
G - 3220	Cities Service Co.
G - 2937 - 2"	Exxon Co.
O - 1873	Humble Oil and Refining Co.
G - 1139	Humble Oil and Refining Co.

APPENDIX C

Smith Point - Tract 246 Pipelines

G - 1140	No data
0 - 2365 - 2"	Humble Oil and Refining Co.
0 - 2044 - 2½"	Humble Oil and Refining Co.
0/G - 1099 - 2"	Humble Oil and Refining Co.
0/G - 2191	Humble Oil and Refining Co.
0 - 2038 - 2"	Humble Oil and Refining Co.
0 - 2054	Humble Oil and Refining Co.
0 - 1662 - 2"	Humble Oil and Refining Co.
0 - 2046 - 2"	Humble Oil and Refining Co.
0 - 2073 - 2" & 2½"	Humble Oil and Refining Co.
0 - 2917 - 2"	Exxon Co.
0/G - 1574 - 2"	Humble Oil and Refining Co.
0/G - 1946	Humble Oil and Refining Co.
0 - 2053	Humble Oil and Refining Co.
0 - 2076	Humble Oil and Refining Co.
G - 1143 - 2"	Humble Oil and Refining Co.
0 - 1679 - 2"	Humble Oil and Refining Co.
0 - 1929 - 2"	Humble Oil and Refining Co.
G - 1412 - 2"	Humble Oil and Refining Co.
G - 1413	Humble Oil and Refining Co.
0 - 2948	Exxon Co.

APPENDIX D

Port Bolivar - Tract 342 Pipelines

O/G - 4012 - 6" & 10"	Houston Oil and Minerals Co.
O/G - 4011 - 3½"	Houston Oil and Minerals Co.
O/G - 3989 - 3½"	Houston Oil and Minerals Co.
O/G - 4024 - 3½"	Houston Oil and Minerals Co.
O/G - 2369 - 2"	Houston Oil and Minerals Co.
O/G - 2559 - 3½"	Houston Oil and Minerals Co.
O/G - 3058 - 4½"	Houston Oil and Minerals Co.
O/G - 2370 - 2" (3)	Houston Oil and Minerals Co.
O/G - 3516 - 2½"	Houston Oil and Minerals Co.
O/G - 3599 - 2½"	Houston Oil and Minerals Co.
O/G - 3465 - 2½"	Houston Oil and Minerals Co.
O/G - 2371 - 6"	Houston Oil and Minerals Co.
O/G - 3402 - 4"	Houston Oil and Minerals Co.
O/G - 3329 - 6 5/8"	Houston Oil and Minerals Co.
O/G - 3880 - 2½"	Houston Oil and Minerals Co.
O/G - 4014 - 4" (2)	Houston Oil and Minerals Co.
O/G - 4015 - 3½" (3)	Houston Oil and Minerals Co.
O/G - 4025 - 3½"	Houston Oil and Minerals Co.
O/G - 3648 - 4½"	Houston Oil and Minerals Co.
O/G - 3691 - 4½"	Houston Oil and Minerals Co.
G - 4121 - 4½"	Houston Oil and Minerals Co.
O - 3703 - 4½"	Houston Oil and Minerals Co.

Port Bolivar - Tract 342 Pipelines

O/G - 3792 - 4½"	Houston Oil and Minerals Co.
O/G - 3271 - 3½" (2)	Houston Oil and Minerals Co.
O/G - 2557 - 3½"	Houston Oil and Minerals Co.
O/G - 3694 - 4½"	Houston Oil and Minerals Co.
O/G - 3868 - 4"	Houston Oil and Minerals Co.
O/G - 2558 - 3½"	Houston Oil and Minerals Co.
O/G - 3625 - 4½"	Houston Oil and Minerals Co.
O/G - 3519 - 2½"	Houston Oil and Minerals Co.
O/G - 3758 - 4½"	Houston Oil and Minerals Co.
O/G - 3507 - 4½"	Houston Oil and Minerals Co.
O/G - 3587 - 4½"	Houston Oil and Minerals Co.
O/G - 3478 - 4½"	Houston Oil and Minerals Co.
O/G - 3069 - 4½"	Seadrift Pipeline Inc.
O/G - 3560 - 4½"	Houston Oil and Minerals Co.
O/G - 3588 - 4½"	Houston Oil and Minerals Co.
O/G - 3492 - 4½"	Houston Oil and Minerals Co.
O/G - 3572 - 6 5/8"	Houston Oil and Minerals Co.
O/G - 3521 - 4½"	Houston Oil and Minerals Co.
O/G - 3816 - 4½"	Houston Oil and Minerals Co.
O/G - 3682 - 6 5/8"	Houston Oil and Minerals Co.

APPENDIX E

Bayside - Tract 117 Pipelines

0 - 4019 - 2½"	Cities Service Co.
G - 1017 - 2½"	Cities Service Co.
0 - 1022 - 2½"	Cities Service Co.
0 - 1023 - 2½"	Cities Service Co.
0 - 3158 - 2½" (2)	Cities Service Co.
0 - 2582 - 2½"	Cities Service Co.
0 - 3965 - 2½"	Cities Service Co.
0 - 3964 - 2½"	Cities Service Co.
0 - 3963 - 2½"	Cities Service Co.
0 - 3953 - 2½"	Cities Service Co.
0 - 3952 - 2½"	Cities Service Co.
0 - 1106 - 2½"	Cities Service Co.
0 - 1107 - 2½"	Cities Service Co.
0 - 2647 - 2½"	Cities Service Co.
0 - 3954 - 2½"	Cities Service Co.
0 - 2610 - 2½" (2)	Cities Service Co.
0 - 2609 - 2½" (2)	Cities Service Co.
0 - 3504 - 2½" (2)	Cities Service Co.
0 - 3583 - 2½"	Houston Oil and Minerals Corp.
0 - 2983 - 2½"	Arco Pipeline Co.
0 - 2986 - 3½"-4½"	Gulf Oil Corp.
0 - 3604 - 2½" (2)	Cities Service Oil Co.

Bayside - Tract 117 Pipelines

0 - 1376 - 3"	Royal Oil and Gas Corp.
0 - 3280 - 2"	Alcoa
0 - 1313 - 3½"	William Herbert Hunt Trust Estate
G - 1313 - 4"	William Herbert Hunt Trust Estate
O/G - 2996 - 8 5/8"	Alcoa

APPENDIX F

Port Ingleside - Tract 8 Pipelines

O - 1839 - 2½" (2)	Cities Service Oil Co.
G - 1843 - 2½"	Cities Service Oil Co.
G - 740 - 2½"	Cities Service Oil Co.
G - 739 - 2½"	Cities Service Oil Co.
G - 1486 - 2½"	Shell Oil Co.
G - 2281 - 2½"	Cities Service Oil Co.
G - 1841 - 2½"	Cities Service Oil Co.
O - 1845 - 2½"	Cities Service Oil Co.
G - 2463 - 2"	Cities Service Oil Co.
O - 1838 - 2½" (2)	Cities Service Oil Co.
G - 738 - 2½" (2)	Cities Service Oil Co.
O - 1844 - 2½"	Cities Service Oil Co.
O - 1499 - 2½"	Cities Service Oil Co.
O - 1842 - 2½"	Cities Service Oil Co.

APPENDIX G

Portland - Tract 62 Pipelines

G - 3529 - 2½"	Gulf Oil Co.
0 - 3525 - 2½" (2)	Gulf Oil Co.
G - 1962 - 4" & 10"	Houston Pipeline Co.
0 - 3526 - 2½" (2)	Gulf Oil Co.
0 - 3524 - 2½" (3)	Gulf Oil Co.
0 - 3527 - 2½" (2)	Gulf Oil Co.
0 - 3530 - 2½" (2)	Gulf Oil Co.
0 - 3790 - 2½" (2)	Gulf Oil Co.
0 - 3528 - 2½" (2)	Gulf Oil Co.
0 - 3861 - 2½"	Gulf Oil Co.
0 - 1437 - 2½" (3)	Cities Service Oil Co.
0 - 4061 - 2½" (2)	C. B. Marino
0 - 4062 - 2½"	C. B. Marino
0 - 2190 - 2½"	Gulf Oil Co.
0 - 1442 - 2½"	Cities Service Oil Co.
0 - 4063 - 2½" (2)	C. B. Marino
G - 2188 - 2"	Gulf Oil Co.
G - 2189 - 2"	Gulf Oil Co.
G - 1522 - 12 3/4"	Florida Gas Transmission Co.
G - 3886 - 6"	Florida Gas Transmission Co.

APPENDIX H

Oso Creek NE - Tracts 9 - 20 Pipelines

0 - 1806 - 2½"	Florida Gas Transmission Co.
0 - 1305 - 6	Humble Oil and Refining Co.
0 - 1304 - 2"	Humble Oil and Refining Co.
0 - 1133 - 2"	Humble Oil and Refining Co.
0 - 1302 - 2"	Humble Oil and Refining Co.
0 - 1113 - 2" & 2½"	Humble Oil and Refining Co.
0 - 2284 - 2½"	Humble Oil and Refining Co.
0 - 3165 - 2½"	Exxon Co.
0 - 1255 - 2½"	Humble Oil and Refining Co.
0 - 1251 - 2½"	Humble Oil and Refining Co.
G - 3152 - 2½"	Humble Oil and Refining Co.
G - 3163 - 2"	Exxon Co.
0 - 3164 - 2"	Exxon Co.
G - 3623 - 2" (2)	Exxon Co.
0 - 3162 - 2½"	Exxon Co.
G - 3624 - 2" (2)	Exxon Co.
0 - 1683 - 2"	Humble Oil and Refining Co.
G - 1683 - 4"	Humble Oil and Refining Co.
0 - 1259 - 2½" & 4"	Humble Oil and Refining Co.
G - 3177 - 2'	Exxon Co.
G - 2213 - 2½" (2)	Humble Oil Co.

Oso Creek NE - Tracts 9 - 20 Pipelines

O - 3161 - 2½"	Exxon Co.
O - 3160 - 2½"	Exxon Co.
G - 2858 - 2½"	Exxon Co.
G - 2859 - 2½"	Exxon Co.
G - 2839 - 2½"	Exxon Co.
G - 2840 - 8"	Exxon Co.
O - 1265 - 2 7/8"	Humble Oil and Refining Co.
O - 1268 - 2½"	Humble Oil and Refining Co.
O - 1271 - 2½"	Humble Oil and Refining Co.
O - 1270 - 2½"	Humble Oil and Refining Co.
O - 1269 - 2½"	Humble Oil and Refining Co.
O - 1267 - 2½"	Humble Oil and Refining Co.
G - 2283 - 2" (2)	Humble Oil and Refining Co.
O - 2775 - 2½" (2)	Exxon Co.
O - 3176 - 2½"	Exxon Co.
O - 3133 - 2"	Shell Oil Co.
G - 3180 - 2½"	Exxon Co.
O - 1298 - 2½"	Humble Oil and Refining Co.
G - 3181 - 2"	Exxon Co.
G - 3182 - 2½"	Exxon Co.
G - 3184 - 2"	Exxon Co.

Oso Creek NE - Tracts 9 - 20 Pipelines

0 - 1295 - 2½"	Humble Oil and Refining Co.
0 - 1299 - 2½"	Humble Oil and Refining Co.
0 - 1666 - 2" & 3½" (3)	Humble Oil and Refining Co.
0 - 3178 - 2½" & 8"	Exxon Co.
0 - 3179 - 2½"	Exxon Co.

APPENDIX I

LEGEND FOR BIOLOGIC ASSEMBLAGE MAPS

Derived from Bureau of Economic Geology Coastal Atlas; Compiled by Texas Coastal Management Program

A_1 Shelf, open marine; normal salinity (35 o/oo); mottled mud; diverse organisms, principally mollusks, crustaceans, and echinoderms; depth greater than 30 feet

A_2 Lower shoreface, open marine; near normal salinity (35 o/oo; salinity varies with flood stage adjacent to Brazos and Colorado River mouths); moderate wave action; sand, silt, and mud; infauna dominant, mud shrimp, mollusks; depth 15 to 30 feet

A_3 Upper shoreface, strong wave action, surf zone, shifting sands; near normal salinity (salinity varies with flood stage adjacent to Brazos and Colorado River mouths); mollusks, sand dollars and starfish, crustaceans; depth low tide to 15 feet

A_4 Shoreface, undifferentiated, adjacent to ebb tidal delta, muddy, open marine; normal salinity (35 o/oo); shell, sparse sand; infauna such as mud shrimp, mollusks, some echinoderms; depth low tide to 30 feet

A_5 Upper shoreface (dominantly erosional); strong wave action, surf zone, shifting sand, shell, and sandstone blocks over bare bay and delta plain muds; near normal salinity (35 o/oo); mollusks and crustaceans; depth low tide to 15 feet

B_1 Inlet and tidal delta, connects open Gulf and bays; sand, mud and shell; diverse epifauna, mollusks, echinoderms, coral and bryozoans, clionid sponges; depth less than 40 feet; small tidal deltas in bays less than 10 feet; sand, mud and shell; fauna variable

B_2 Delta front (Brazos and Colorado Rivers), open marine; near freshwater to normal salinity (35 o/oo); moderate to strong wave action; rate of terrigenous sediment input about equalled by intensity of marine processes; sand nearshore to sand and mud offshore; rare mollusks and echinoids, some mud shrimp; depth low tide to 30 feet

B_3 Prodelta (Brazos and Colorado Rivers), open marine and bay; near freshwater to normal salinity (35 o/oo); moderate to strong wave action; mud and silt; rare macroinvertebrates; depth in Matagorda Bay 1 to 3 feet, depth off the mouth of the Brazos River 6 to 40 feet

APPENDIX I
LEGEND FOR BIOLOGIC ASSEMBLAGE MAPS

C_1 Bay and lagoon margin, shoal water bordering bay; shell with sand, sand to mud, shifting sandbars; sparse marine grass; variable salinity and temperature; mollusks and crustaceans; depth to 6 feet. In Laguna Madre, seasonally hypersaline shoal water bordering mainland; sand, some shell, shifting sandbars; sparse grass, algae; salinity 30-80 o/oo; temperature 12-43°C; mollusks, low diversity; depth less than 3 feet; unmapped saltwater marsh along shore

D_1 Grassflats, shallow bay margin with dense marine grasses; salinity 25 to 35 o/oo; moderately diverse molluskan assemblage; depth less than 5 feet

D_2 Grassflats, hypersaline, sparse to moderate grass; sand, shell, and muddy sand; salinity 30-80 o/oo; temperature 12-43°C; abundant mollusks, low diversity, algae; depth less than 4 feet

D_3 Restricted hypersaline bay and lagoon margin, away from tidal influence, rare river input; local oolites, muddy sand; salinity 5-80 o/oo, normally greater than 30 o/oo; temperature 12-43°C; sparse grass; clams, low population and diversity, algae; depth less than 6 feet; thin band of salt marsh along mainland shore

E_1 Open bay, lower end of bay with tidal influence; salinity 10 to 20 o/oo, fluctuating with rainfall and storms (Beaumont-Port Arthur area), salinity 20 to 35 o/oo (remainder of coast); laminated to mottled sand, silt and mud; high species diversity, infauna, mollusks; depth 3 to 15 feet

E_2 Open bay with reefs, similar to open bay, with scattered clumps of oyster reef; depth 2 to 10 feet

E_3 Enclosed bay, away from tidal or river influence; mottled mud, similar to open bay but reduced species diversity; clams; depth a few inches to 12 feet

E_4 Enclosed bay with reef, similar to enclosed bay, with scattered clumps of oyster reef; depth 1 to 8 feet

E_5 River-influenced bay (or bay influenced by freshwater runoff from adjacent freshwater marshes, lakes, and cuts through Intracoastal Canal); low salinity (commonly less than 10 o/oo), near freshwater discharge; laminated mud and silt, mottled mud; low species diversity with mollusks and crustaceans; depth a few inches to 7 feet

E_6 Enclosed hypersaline bay or lagoon center, away from tidal or river influence; mud, mottled; salinity 30-80 o/oo; abundant mollusks, low diversity; depth 4 to 12 feet

APPENDIX I
LEGEND FOR BIOLOGIC ASSEMBLAGE MAPS

E_7 Restricted bay center, hypersaline, closed to tidal input, rare river influence; bottom euxinic, laminated mud in deeper parts; restricted from Laguna Madre by reef sill; salinity 5-80 o/oo, commonly greater than 30 o/oo, barren or rare organisms; depth 6 to 12 feet

E_8 Enclosed hypersaline bay or lagoon center with some tidal influence via Port Mansfield channel

F_1 Reef, dense oysters, distinct mounds or ridge-like; commonly aligned normal to circulation; firm substrate; salinity variable (commonly less than 35 o/oo); depth less than 8 feet; associated mollusks, coral, bryozoans; arthropods and worms (Bay City-Freeport area)

F_2 Reef flank and margin, relatively level bottom between reefs; few clumps of oysters; sand, mud, and broken shell; salinity variable (commonly less than 35 o/oo); depth less than 12 feet

F_3 Serpulid reefs (relict) and interreef shoals; shell, sand, reef rock, beach rock near mouth of Baffin Bay; high wave energy, ridge or mound bathymetry; salinity 5-80 o/oo; temperature 12-43°C; depth to 6 feet

G_1 Subaqueous sand flat; hypersaline; barren to sparse grass; salinity 30-80 o/oo; temperature 12-43°C; locally abundant clams; "The Hole" restricted by spoil sill, radical salinity and temperature changes, depth to 3 feet

H_1 Sand and oolite shoal, high wave and current energy; mounds; rare clam infauna; grass absent; salinity 30-80 o/oo; temperature 12-43°C; depth 4 to 7 feet

I_1 Subaqueous spoil, shell, sand, and silt, normally poorly sorted; assemblage depends on age and local setting; depth variable

I_2 Subaerial spoil, similar to subaqueous spoil, elevation variable

J_1 Fresh- to saline-water bodies, landlocked ponds and lakes, playas; variable substrate; inland water bodies fresh, playas and coastal water bodies temporarily brackish or saline

K_1 Beach, low tide to 5 feet above sea level; swash zone, high energy forebeach; marsh mud, sand, shell debris; mollusks and crustacean infauna; back-beach seaoats and halophytes, dunes, ghost crabs

L_1 Unvegetated coastal mud flats, filled coastal lake, and filled washover channel; frequently flooded; rare algae; some burrowing arthropods

APPENDIX I
LEGEND FOR BIOLOGIC ASSEMBLAGE MAPS

M_1 Vegetated barrier-strandplain flat or shell ramp barrier flat; fore-dune ridge; shell ramp (Bay City-Freeport area); beach ridge and vegetated flat (upper coast), stabilized blowouts, sand, shell (lower coast); relief 2 to 45 feet; salt-tolerant grasses; mesquite, live oak, and salt-cedar (upper coast), vines, local freshwater marsh (lower coast); ghost crabs, rodents, snakes, fowl

M_2 Grass and locally scrub oak-covered ridges; sand and shell, elongate topographic ridges; well drained, permeable, surrounded by mud or marsh; grasses similar to vegetated barrier-strandplain flat; small rodents, snakes, fowl

N_1 Washover channel, fan and wind-deflation trough and storm runnel; sand, local mud, barren algal mats, local ponds and freshwater marsh

O_1 Active dunes, coppice dunes, blowouts, back-island dunes, barren; relief 3 to 40 feet; rodents, snakes

O_2 Eolian ridges and active clay-sand dunes; accretionary; intense wind, salt-tolerant grasses; snakes

O_3 Berms along and near bay-lagoon margin, storm deposits, sand, shell, local salt- and brackish-water marsh in swales and ponds, salt-tolerant grasses, snakes, fowl; unmappable narrow band of salt-water marsh along shore (lower coast)

O_4 Intense wind-deflation and wind-tidal activity, erosion of sand sheet; salt-tolerant grasses on small unmapped clay dunes; algal mats

P_1 Sand flats; a few inches above mean sea level (MSL), undulatory sand surface with blue-green algal mats, thin halite film, marsh plants rare (upper coast); wind-tidal, local mud, algal mats, emergent-submergent, -1 foot to +2 feet MSL, and barren lower-stream courses, ephemeral, sand (lower coast)

Q_1 Saltwater marsh, frequently inundated by tides; sand, muddy sand to mud; cordgrass, glasswort, seepweed, sea-oxeye; mollusks, crustaceans, mammals, fowl

Q_2 Brackish to freshwater marsh, sand, muddy sand, and mud, grades into saltwater marsh; coastal sacahuista, marshy cordgrass, big cordgrass, bullrush, cattail, rushes; mammals, snakes, fowl

Q_3 Brackish-water marsh (closed), low and perennially wet, salt water from storms, fresh water by rainfall and runoff; saltgrass, rushes; mammals, fowl

APPENDIX I
LEGEND FOR BIOLOGIC ASSEMBLAGE MAPS

Q_4 Inland freshwater marsh, sand and/or mud; rushes, bullrush, cattail, slough-grass; mammals, snakes, fowl; small unmapped marshes in sand and loess areas; some areas occupied by high-moisture, non-marsh plants and ephemeral marsh (lower coast)

R_1 Barren land, abandoned tidal creeks, small bayside beaches, sand flats, active point bars, margins of small coastal lakes

R_2 Made land, filled, graded, sand, mud, and shell; locally some vegetation

S_1 Frequently flooded fluvial areas; water-tolerant plants, mud to sand; freshwater reeds, rushes, and trees; mammals and fowl

S_2 Prairie grasslands, flat to gently rolling upland; prairie grasses, mud and sand substrate, much of area cultivated, bluestem, indiangrass, chaparral, mesquite, hackberry, huisache, cactus, some oaks and brush; fowl and small mammals (upper coast); mud, silt, sand, uncultivated, distinctive grasses, mesquite, cactus, huisache, chaparral, fowl and mammals (lower coast)

S_{2a} Prairie grasslands, flat to gently rolling upland, sand substrate; chaparral, grasses, mesquite, catclaw, cactus, hackberry, slightly more brush growth, extensively cultivated

S_3 Swamp, poorly drained, sediment and water supplied by overbanking fluvial systems; sand and mud; dwarf palmetto, cypress, elm, bay, mulberry, water oak, gum, grapevine, and yaupon; raccoon, opossum, some mink and squirrels, fowl, snakes

S_4 Fluvial woodland; water-tolerant hardwoods, pecan, hickory, live oak, water oak, blackjack oak, elm, hackberry, Magnolia, sweetgum, red haw, ash, shortleaf pine, carpetgrass, bermuda grass, greenbriar, yaupon, grape; mammals, fowl, snakes (upper coast); short timber, sparse, discontinuous, some hardwood, mesquite, huisache, mammals, fowl (lower coast)

S_{4a} Fluvial woodland, short timber, sparse, discontinuous, some hardwood, mesquite, huisache; mammals, fowl

S_{4b} Fluvial woodlands, silty clay, silt, and sand substrate; seasonally flooded; diverse assemblages of trees, shrubs, and vines, local areas of palm groves; inland stream courses predominantly heavy brush; extensively cultivated

S_5 Mixed pine and hardwood forest, sand and clay, well drained; loblolly pine, longleaf pine, shortleaf pine, gum, cypress, oak, hickory; mammals, fowl, snakes

APPENDIX I
LEGEND FOR BIOLOGIC ASSEMBLAGE MAPS

S_6 Loose sand and loess prairies, bunch grasses, commonly overgrazed, scattered oak mottes, freshwater marsh in blowouts and depressions in wet cycles; rodents, mammals, snakes, fowl

S_7 Brushland, moderately stabilized dunes, inactive clay-sand dunes, some loess deposits; mesquite, chaparral, other scrub, distinctive grasses, cactus; game, fowl, climax vegetation

S_8 Fluvial grassland; grasses and brushes, bluestem, sacahuista, mesquite, catclaw, Acacia; mammals, fowl, snakes

S_9 Oak mottes and groves, live oak and dwarfed live oak; permeable and well drained; salt spray may kill leaves on windward side, grow rapidly leeward producing sculptured oak mottes; rodents, snakes

S_{10} Poorly drained depressions, mud substrate, occasionally flooded or pond water; locally seasonal hydrophytes, other high-moisture plants and prairie grasses; extensively cultivated (Brownsville area)

S_{10a} Poorly drained depressions, mud substrate, occasionally pond water, mesquite, granjeno, huisache, retama, lovegrass; extensively cultivated

S_{11} Fluvial brushland, sand and silt substrate, occasionally flooded; dense mesquite, chaparral, ebony, brazil, guayacan, allthorn, cactus, sparse grasses; extensively cultivated

S_{12} Saline grasslands, mud, coastal sacahuista, other salt-tolerant grasses and alkali weeds; inland areas grade into brush-covered bottomlands and fluvial brushlands; coastal areas grade into saltwater marsh (unmapped where narrow belt) and wind-tidal flat

S_{13} Small prairies in forested uplands, coarse grass with scattered pines and hardwoods; muds; mammals and fowl

APPENDIX J

SURFACE SEDIMENT DISTRIBUTION KEY

MUD

A_A - Mud

A_B - Sand mud

A_C - Shelly mud

A_D - Sandy shelly mud

SAND

B_A - Sand

B_B - Muddy sand

B_C - Shelly sand

B_D - Muddy shelly sand

SHELL AND GRAVEL

C_A - Shell and rock fragment gravel

C_B - Muddy shell

C_C - Sandy shell

C_D - Sandy muddy shell and muddy sandy shell

REEF

D_A - Reef, oyster and serpulid

OTHER

- Relict stiff mud

FAULT

- Inactive faults that do not intersect seafloor and area commonly overlain by continuous seismic reflectors. No movement in recent geologic past indicated. Apparent displacement measured at depths of 400 to 600 feet

- Potentially active faults that intersect seafloor or are near seafloor. Movement has occurred in recent geologic past and reactivation is likely. Approximate displacement measured at depths of 400 to 600 feet.

APPENDIX K

Standards for Pipelines Requiring a Right-of-Way Across Public Lands

All pipelines or utility lines crossing state-owned submerged lands must be granted a right-of-way by the General Land Office.

Source	Standard
GLO Rule 126.18.02.002(a)	An easement or lease for pipelines over state public lands binds the grantee to comply with all existing rules and orders which the Commissioner determines to be necessary and proper in order to provide for the protection and conservation of the natural resources of public lands and waters.
GLO Rule 126.18.02.002(b)(1)	If an easement is obtained for pipeline purposes, the applicant is bound to comply with additional terms and conditions, except those waived by the Commissioner; these conditions are: * to bury the pipeline below the bottom of the gulf, bay, or inlet crossing at a depth not less than 24 inches or placing the pipeline on a structure of sufficient height to insure reasonable safety from sustaining flood damage; * to water-pressure test all lines before use to one and one-half times the anticipated working pressure; * to construct a steel line from new or reconditioned pipe in first class condition; * to electrically test or x-ray any steel line field weld to insure reasonable safety from leaks; * to dope and treat any steel line before it is submerged to offer reasonable resistance to the corrosive effect of salt water; * to bury a pipeline in such a manner so as to backfill evenly the sand, gravel, soil, or other material excavated during construction onto the disturbed area to conform as much as is reasonably possible with the bottom profile of the adjacent natural submerged land; * to undertake erosion preventative measures at shorelines by either terracing or excavating cuts, fills, or other disturbed areas

so that they may naturally vegetate, seeding cuts and fills as soon as possible to prevent erosion, or placing gravel, stone, or rock in cuts or on fills where site factors make it unusually difficult to establish a protective vegetative cover;

* to select a right-of-way, when feasible which avoids shell reefs, submerged grass beds, and marshes.

GLO Rule
126.18.02.002(b)(3)

In the event the easement is on State-owned upland and is for a pipeline construction purposes, the applicant must bury any pipeline at least 24 inches below the surface and construct the pipeline so as not to interfere with the use of the land for grazing of livestock or for farming in the usual manner; limit clearing of natural vegetation to that material which poses a hazard or a hindrance to the construction of the pipeline; minimize clearing so as to leave a screen of natural vegetation where the right-of-way crosses a highway.